APRIL 6, 1944

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IRON AGE

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WITH TIMKEN BEARINGS

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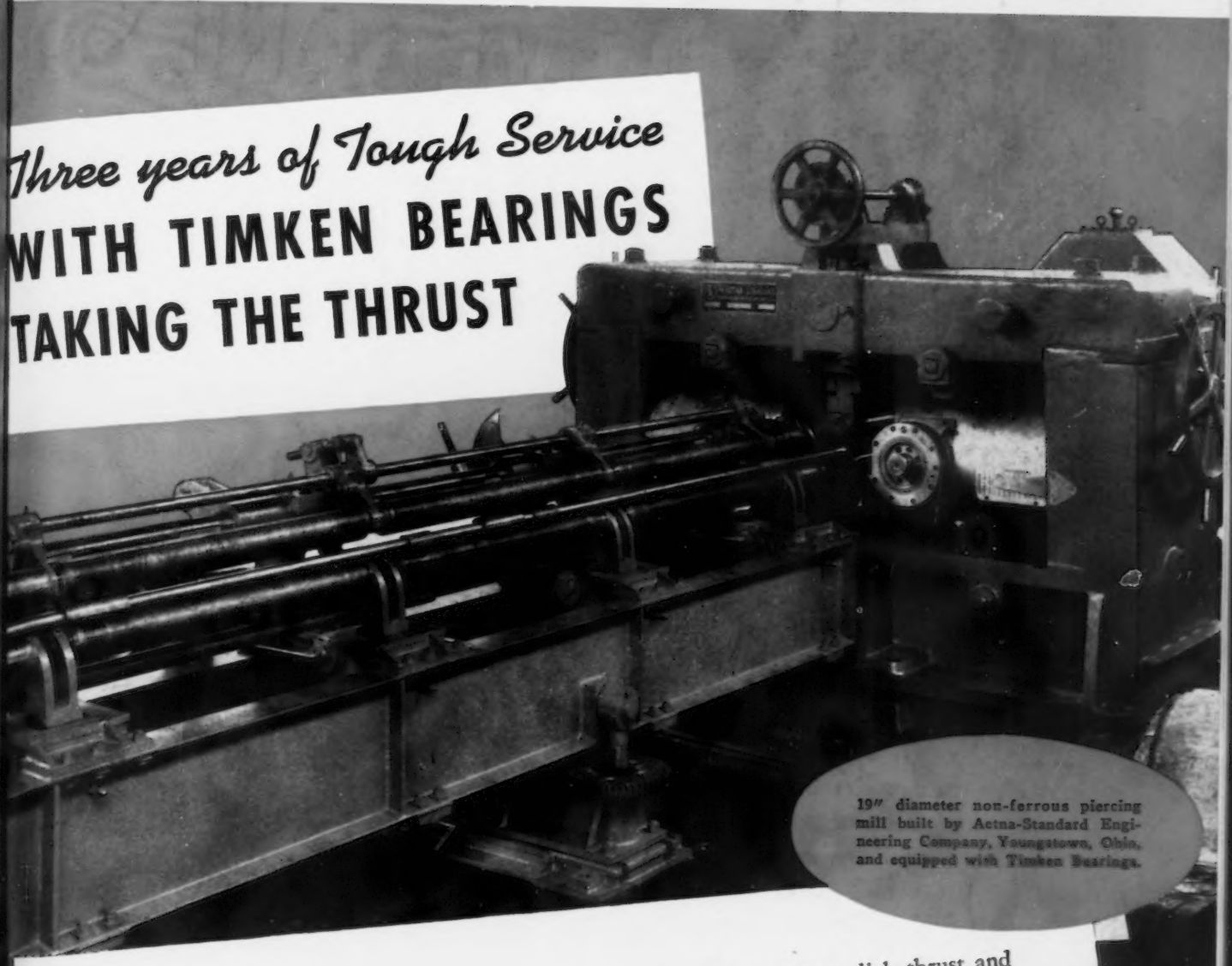

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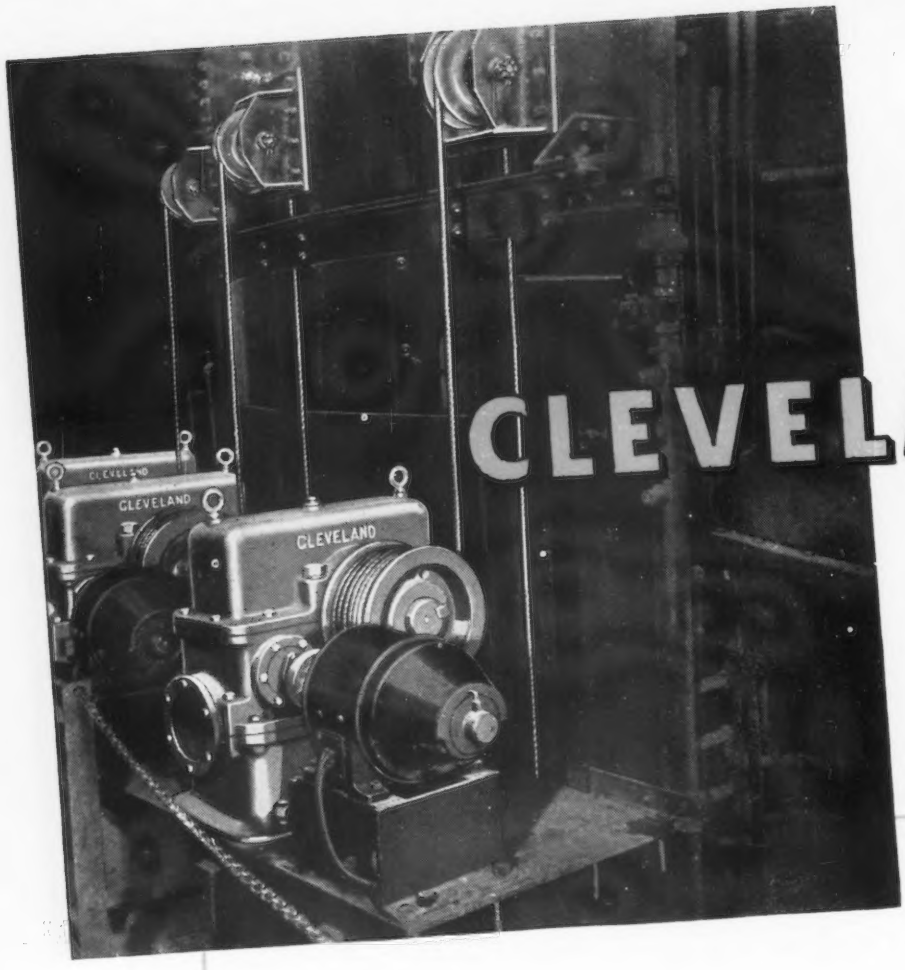

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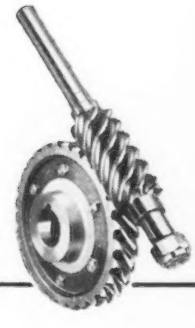

CLEVELAND WORM GEAR SPEED REDUCERS

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 153, No. 14.

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Heads

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Executive Offices
Chestnut and 56th Sts.
Philadelphia 39, Pa., U.S.A.

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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year. Single Copy, 35 cents.

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Cable Address, "Ironage N. Y."

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Intricate Shapes Quickly Cut by Flame

Short Cuts and Economies Developed . . . Time Saved

Many manufacturers are revolutionizing their products, saving time and effecting many economies by using strong rolled steel, flame-cut to exact size and shape. No matter how intricate, Ryerson flame-cutting equipment produces neat accurate work—and hundreds or thousands of identical pieces are turned out quickly.

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April 6, 1944

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Tool Improvement and Machine Tool Obsolesence

MACHINE tool builders in general are more optimistic about their postwar prospects than they were a few months ago. Those of them who are not should reflect upon the fact that developments in cutting tools may very well create a greater obsolescence of existing machine tools than will wear and tear. Which reminds me of a story.

A tool engineer had a dream. He dreamt that he had been turned into a machine tool but that instead of being an insensate mechanism he had all of the human senses, and he was always hungry for a square meal of chips.

As this dream began, our friend, the animated machine tool, was having trouble with his teeth. They could not bite off enough chips to satisfy the requirements of his robust body. So he ambled to the dentist who also was a tool engineer.

"Those carbon steel teeth of yours have seen their best days," said the dentist. So he fitted his patient out with a fine set of high speed chewers which, incidentally, had just come on the market.

For a short time all went well and the meals were sumptuous, but after a month or so aches and pains developed in our subject's body. His joints were rattling and his teeth chattering. So this time he went to an MD, the letters standing for machine designer.

The MD said, "My friend, your teeth are too powerful for your body." So he fixed our friend up with a larger spindle, bigger motor, chrome nickle gears and shafts and an increased range of feeds and speeds.

All went well again for a little while but after a time the animated machine tool found that even his high speed uppers and lowers could not bite off enough chips to satisfy his invigorated body. So he took another trip to the dentist.

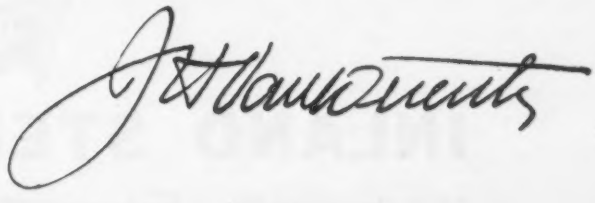
"I have here the latest and best chewers on the market," said the dentist and proceeded to fit our friend with carbide tipped dentures. "Go ahead now and chew your head off if you want to," he told his patient.

Grand chewing was had for a time, but again trouble developed in the body members. They couldn't handle the hearty meals that were merely duck soup for the new teeth.

So our friend went again to the MD and told him to give him the works. When he got off the operating table he had hydraulic feed, flame hardened ways, push button control and a motor as big as a hen house.

Fortunately for us and thus enabling this tale to terminate, the tool engineer woke up just as the cycle was about to repeat. And his remarks on awakening were: "I wonder who in heck is going to win this race."

Some of us are wondering about that, too!



The press stamps landing mat sections out of heavy gage Inland sheets. The much-needed scrap goes back to the steel mills.

Finished landing mat sections are cleaned, painted, bundled, and shipped to fighting fronts.

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Laying these interlocking sections, on desert sand or tropic mud, 70 men can build a landing strip, 1,500 ft. long by 150 ft. wide, in the record time of 24 hours. Large bombers need a runway 5,000 ft. long by 150 ft. wide, requiring 750,000 sq. ft. of landing mat sections. The remarkable speed with which air bases are built with steel mats assures our fighting men maximum air protection in the shortest possible time.

Production of landing mat sections is only one of the many war-time uses for Inland's entire sheet output. Among others are: blitz cans, shell cases, bombs, bomb racks, pontoons, ammunition boxes, and parts for airplanes, trucks, jeeps, etc. While producing at maximum capacity for Victory, we are also preparing to supply steel for the needs of America at peace.

ARMY E NAVY

INLAND STEEL COMPANY

38 S. Dearborn St. — 50th ANNIVERSARY — Chicago 3, Illinois

Milwaukee Detroit St. Paul St. Louis Kansas City Cincinnati New York

The IRON AGE

APRIL 6, 1944

NEWS FRONT

► The drive against complacency concerning scrap supplies received additional impetus by E. C. Barringer, who warned that while carbon steel scrap consumption increases, purchased scrap stocks are declining.

Also discussing the scrap situation was Carl Ilgenfritz, Republic Steel Corp's. director of purchases, who pointed out that while steel mills were hungry for No. 1 heavy melting scrap, there is very little that the steel industry can or will do about absorbing excesses of less desirable grades.

► Government cooperation by removing unnecessary regulations, adopting sound measures for contract cancellation and disposal of surplus war goods and enacting sound tax legislation is essential for postwar prosperity, Tom Girdler says.

Majority of disputes handled by the Conciliation Service involve pay rates, hours of work and vacations. During the past year, 3119 cases in the iron and steel industry were referred to this service.

► Of 9502 contracts ended by the War Department three-quarters brought no financial claims whatever. Actual cash settlement totaled about 75 per cent of the claim value and sub-contractors received less than one-fifth of the settlement money paid.

► Railroad construction and expansion plans are going ahead in Chile with the government planning to spend about $10 million in the United States for materials and equipment.

► The papers are giving quite a play to Reynolds Metals Co. new aluminum alloys R301 and R303, crediting them with possibilities of pushing steel out of the picture for everything from aircraft to lawn mowers.

The two Reynolds alloys apparently have a tensile strength on the order of 64,000 lb. per sq. in. and an elongation of 8 percent. The alloy has good workability and is stable in the as-quenched condition; being easily formed it can go into many shops for miscellaneous fabrication, and requires only an oven cooking of about 350 deg. to attain maximum properties.

The alloy apparently has a 14S core with 61S coating on each side. The 14S alloy (4 percent copper, some Si, Mg and Mn) used to be quite interesting but lately has not been used extensively. Other new high strength alloys are some of the Aluminum Co. X alloys, which on a second artificial aging attain 80,000 lb. per sq. in. tensile with some 6 to 8 percent elongation.

► When Chile completes its steel expansion program, one-half of its own steel requirements will be met by domestic output. The Latin-American country plans to invest $20 million in the enterprise.

Operation of the plant with annual capacity of 100,000 tons of finished steel is expected to begin in the summer of 1946.

► During 1943, railroads received over one and a half million tons of new steel rails. For 1944, ODT has asked for 2,200,000 tons to be allocated.

► An 80-in. butt-flash welder built by Taylor Winfield Corp. will weld low carbon steel strip ranging from about 0.075 in. minimum thickness to 0.187 in. maximum and from 18 to 80 in. wide.

To solve the problem of strip alinement, this welder is equipped with two cutting torches which trim the ends of the strip so that they are exactly parallel.

► 32 British steamship lines have made application to operate airlines after the war.

► The average age of some 65,000 women employees of Douglas Aircraft is 32 years.

► An average of 350 airplanes was built each working day in February.

► Flash Gordon to the contrary: A. E. Raymond, vice-president of Douglas, says that the largest postwar transport plane required for general transoceanic service will weigh about 150,000 lb., have four engines and will carry approximately 100 passengers and 20,000 lb. of freight. It will cruise at 250 m.p.h. and fly at 20,000 ft.

Hardening NE 8745 Steel

By DONALD E. RODA
and
FRANK C. BRAUTIGAM
Metallurgy Department, National Postal Meter Co., Inc., Rochester, N. Y.

. . . The experiments reported herein indicate that NE 8745 steel hardens at a lower temperature than might be expected. Also, the correlation between the Rockwell hardness and microstructures is of general interest and shows that hardness values alone cannot be taken as an indication of complete hardening.

THIS is a practical approach to the method of hardening a definite part in industry, and the main object is the determination of the proper hardening temperature and the length of time required. Other considerations which are integral parts of the hardening operation are also included.

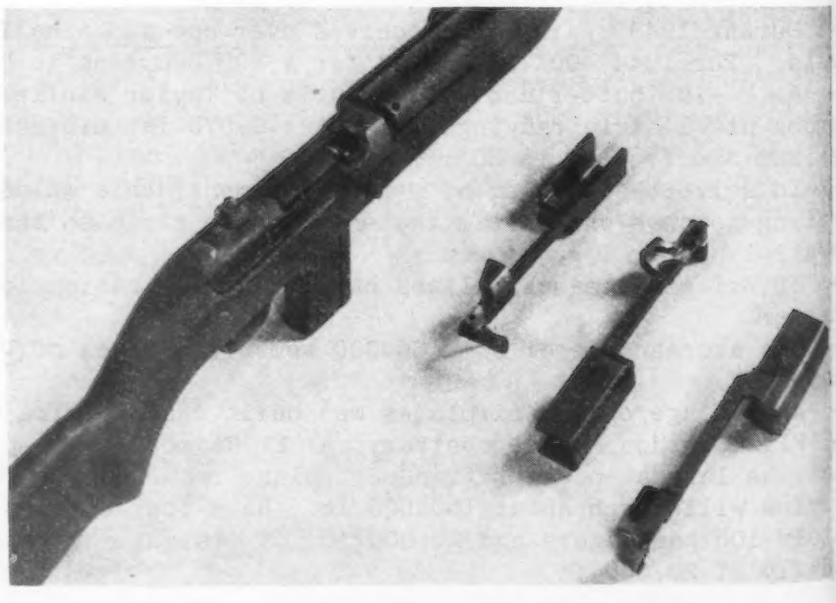
The usual practice in many industries, which are not equipped to determine the critical temperatures of steel, is to look for this information in handbooks or catalogs. For proper hardening, the low alloy or industrial steels must be heated above the Ac_3 range or above the temperature range in which the steel undergoes transformation and the carbides go into solution for complete hardening and good physical properties. A homogeneous austenitic structure is desired with possibly a few undissolved carbides which serve the beneficial purpose of preventing grain growth and coarse grains over a considerable temperature range in alloy steels. With the N. E. steels there is very little published information on the critical temperature. The Ac_3 point of complete transformation on slow heating is reprinted from two sources in Table I.

From these tables which are in fairly good agreement it would be assumed that the critical temperature on slow heating for 8745 steel with carbon close to 0.45 would be approximately 1430 deg. F. All commercial hardening furnaces heat at a much faster rate than the furnaces used for determining critical temperatures. Therefore, less time is allowed at any given temperature for complete transformation and solution of the alloying elements in the austenite in the practical hardening operation. Actually the complete transformation occurs at a higher temperature in practice than the published critical temperatures would indicate. Looking at this in a different light, the hardening temperatures used are set above the tabulated critical temperatures to speed the reaction.

The part under consideration is the operating slide which is shown in Fig. 1 along with the M1 Carbine to indicate its size. It was to be hardened in a neutral salt which is one of the fastest heating mediums. The general practice with low alloy steels (except tool steels) is to heat the part to a temperature approximately 75 deg. above the Ac_3 point in all types of commercial hardening furnaces. The time at heat is adjusted to suit the heating rates of the different furnaces. For materials on the low side of the carbon range of 8745 steel this would give a hardening temperature of 1525 deg. F. and for material on the high side a hardening temperature of 1495 deg. F.

The question arose whether the hardening temperature should be 1500 deg. or 1525 deg. F. Since NE 8745

FIG. 1—Three views of the operating slides are shown along with the Carbine 30 MI of which it is a component part, to indicate the size of the slide.



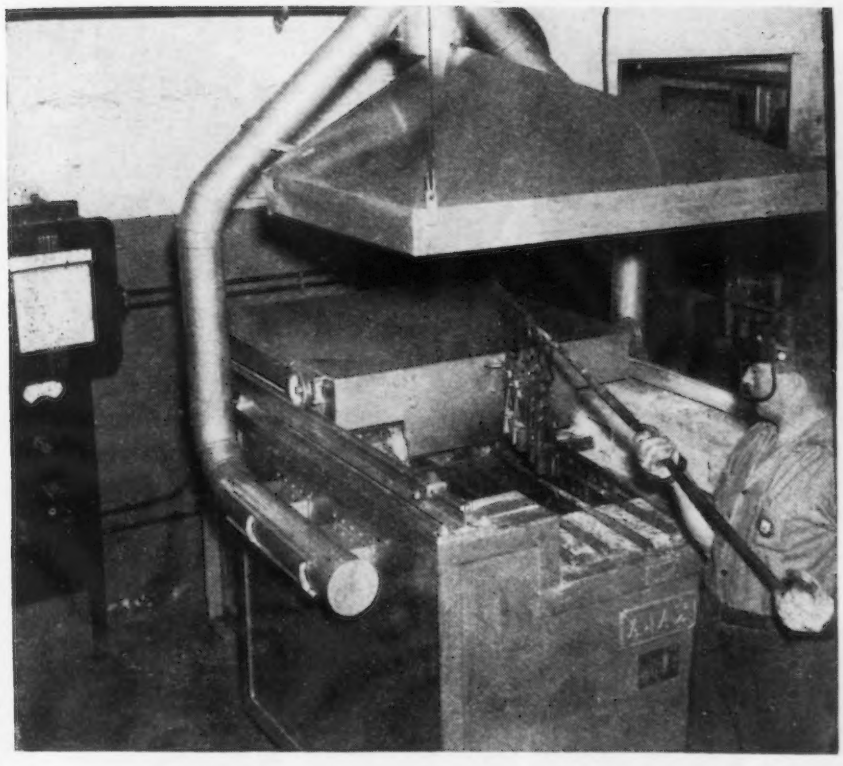


FIG. 2—The operating slides are hardened on fixtures in an electrically heated salt bath with automatic temperature control, as shown here.

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is a new steel, experiments were conducted to determine what the factor of safety would be for both hardening temperature and heating time using the lower figure 1500 deg. F. The analysis of the material used in this test was made by one of the leading analytical chemists in Cleveland, and is included in Table I. It so happens that the material falls midway between the analysis given for the two commercial heats used in determining the critical temperatures of 1420 deg. and 1450 deg. F. for all elements, except nickel which is slightly higher. However, this amount of nickel would only tend to depress the Ac_1 point a few degrees.

In order to determine the lowest possible hardening temperature and shortest possible hardening time, test pieces were hardened at 1500 deg. F. in the neutral salt for 8 min. and at lower and lower temperatures until the microstructure and Rockwell hardness indicated failure to harden. Parts were also hardened holding the temperature constant at 1500 deg. F. and varying the time from 15 sec. to 1 hr., and the microstructure and hardness values obtained in both cases are given in Figs. 3 and 4.

Although the expectation would be to learn very little from such a test, the unusual results obtained reveal how worthwhile a little experimental work can be in the heat treat department. Even the common every day things need checking and rechecking. For as sure as the sun shines, heat treating practices are alive and subject to many variations. Obviously the heat treating experiments should be well guided.

The operating slides are hardened in the electrically heated salt bath shown in Fig. 2. The test pieces were also hardened in the same furnace and a thermocouple was inserted in the front end of the salt bath to give the temperature of the salt on a separate Foxboro indicator at the point where the pieces were actually being hardened. A second thermocouple was placed next to this thermocouple to check the indicator with a Leeds & Northrup portable testing Pyrometer during each test. Although this type of furnace is noted for uniform temperature throughout the bath, due precautions were taken to insure that the temperature of the furnace, as recorded by the automatic temperature control and indicated by the special testing instruments, never rose above the temperatures shown in the following figures. During the 8-min. heating period the temperature did fluctuate slightly but never rose above the temperatures indicated. The pieces were all quenched at exactly the temperatures given. The temperature of this furnace has been checked by representatives of both Brown Instrument Co. and Leeds & Northrup Co. and found to be accurate. This is all new equipment and the temperatures indicated are as exact as it is possible to determine temperatures at 1400 deg. F. to 1500 deg. F.

The operating slide which is the part under consideration is shown in Fig. 1 along with a Carbine 30M1 of which it is a component part. It is needless to say, that all parts of this gun are highly stressed and must be satisfactorily heat treated for the expected endurance life. It will be noted that the slide is made up of two sections, a smaller section representing the arm which operates the bolt and a heavier section where the piston hits the slide to drive it backward to perform the automatic functions of the carbine. For this test, pieces representing a section of the same size as the arm were used, which is approximately $\frac{3}{16}$ in. thick by $\frac{5}{8}$ in. wide. These parts were heated in the salt bath next to the test thermocouple for the times indicated and quenched in oil. The automatic temperature control was augmented by hand control to obtain the temperatures desired which were observed and recorded as previously discussed. Hardness values were obtained and the

TABLE I

Critical Temperatures and Chemical Analysis

N.E. Steel	C	Mn	P	S	Si	Ni	Cr	Mo	Ac_1, Deg.F.	Source and Date
8739 8749	0.41 0.54	0.86 0.83	0.015 0.015	0.019 0.015	0.31 0.23	0.46 0.46	0.47 0.52	0.26 0.27	1450 1420	Metal Progress Metal Progress January 1943
8740 8744 8749									1450 1430 1410	N. E. Steels by Republic Steel Corp., July 1943
8745	0.464	0.84	0.023	0.016	0.29	0.58	0.50	0.26		Material used in this experiment, December 1943

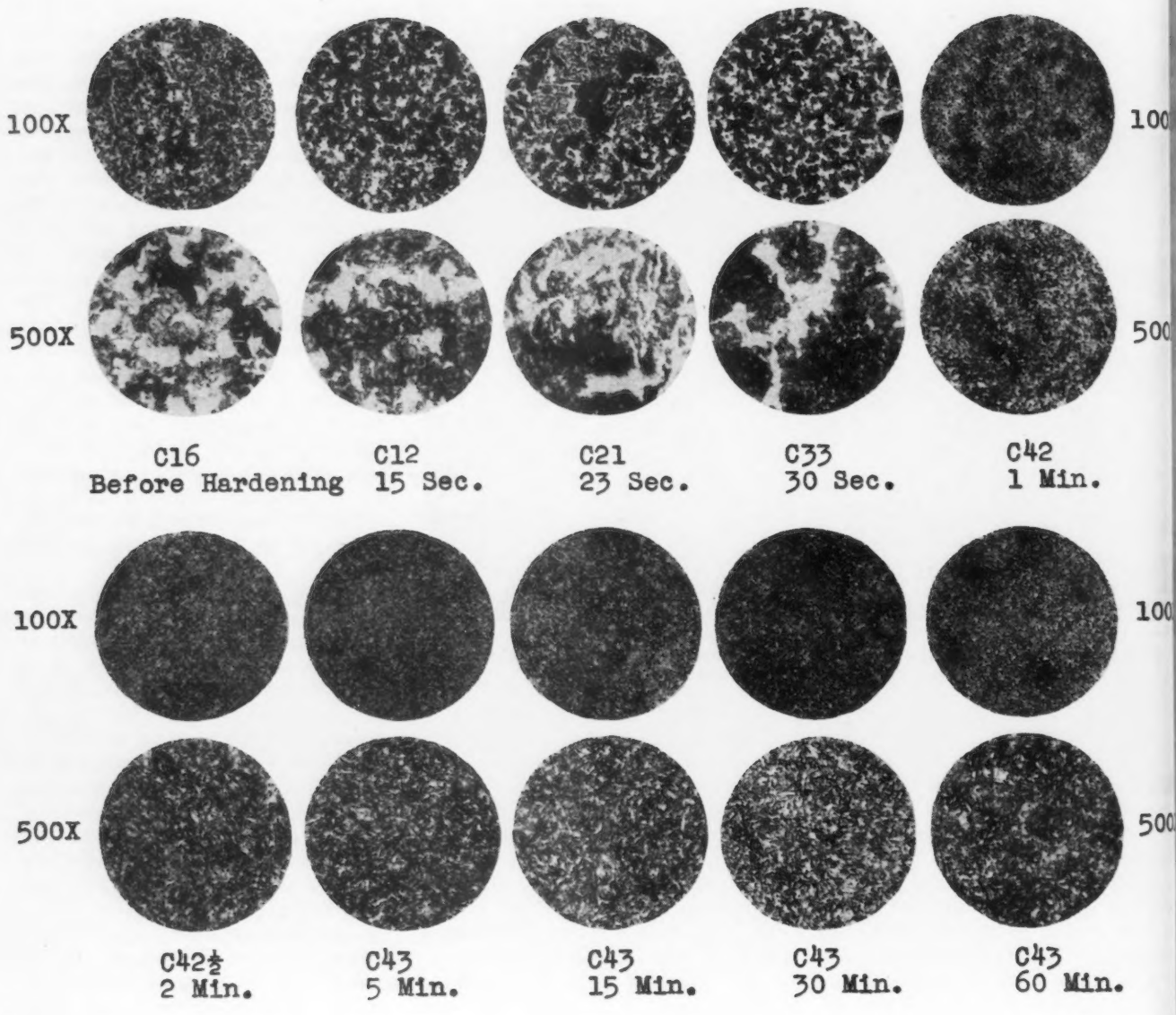

FIG. 3—Hardened and drawn structures obtained by hardening NE8745 steei at 1500 deg. F. and holding in the salt bath for the times indicated. Oil quenched and tempered at 775 deg. F. for 2 hr.

parts were then drawn at 775 deg. F. for 2 hrs. in a commercial drawing furnace and the hardness values were again taken along with the microstructures. These hardness values as quenched and after drawing are given in Table II, and the microstructures are shown in Figs. 3 and 4, all of which were taken at the same section in each test piece.

Tests were made at 5 deg. intervals from 1370 deg. F. to 1430 deg. F., and the photomicrographs shown in Figs. 3 and 4 are representative of the results obtained.

A glance at Table II would indicate that the N. E. 8745 steel hardened all the way down to 1370 deg. F. However, the microstructure reveals considerable free ferrite at this temperature. At 1400 deg. F. the free ferrite has almost disappeared and at 1410 deg. F. there is no indication of free ferrite, and the Rockwell hardness has increased to the values of the completely hardened steel. However, the microstructure is a little fuzzy at this temperature. From 1420 deg. to 1600 deg. F. there is no change in hardness or in microstructure.

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When the temperature of the salt bath was held constant at 1500 deg. F. and the heating time varied from a few seconds to one hour, a greater variation of hardness was obtained. Again the Rockwell hardness would indicate complete hardening after one minute in the salt bath although the microstructures reveal that at least 2 min. are required before the resultant hardness and microstructure is similar to that obtained at longer times. These microstructures shown in Fig. 3 start with the normalized and annealed structure at a hardness of Rockwell C16. Fifteen sec. in the salt bath further annealed this piece as shown by the lower hardness value and made a slight change in the structure. In 23 sec. the hardness began to rise and a mixture of hardened and annealed structures are revealed. After 30 sec. there was considerable free ferrite left in the hardened structure and in 1 min. the ferrite had completely disappeared although here again the hardened structure was a little fuzzy. Uniform hardness and structures were obtained with times varying from 2 min. to 1 hr. in the salt bath.

Instead of having a narrow margin of safety of 10 deg. F. as was expected in hardening the operating slides at 1500 deg. F., the results in Fig. 4 show a large safety factor of approximately 80 deg. F. The information on the time required for heating shown in Fig. 3 also reveals the

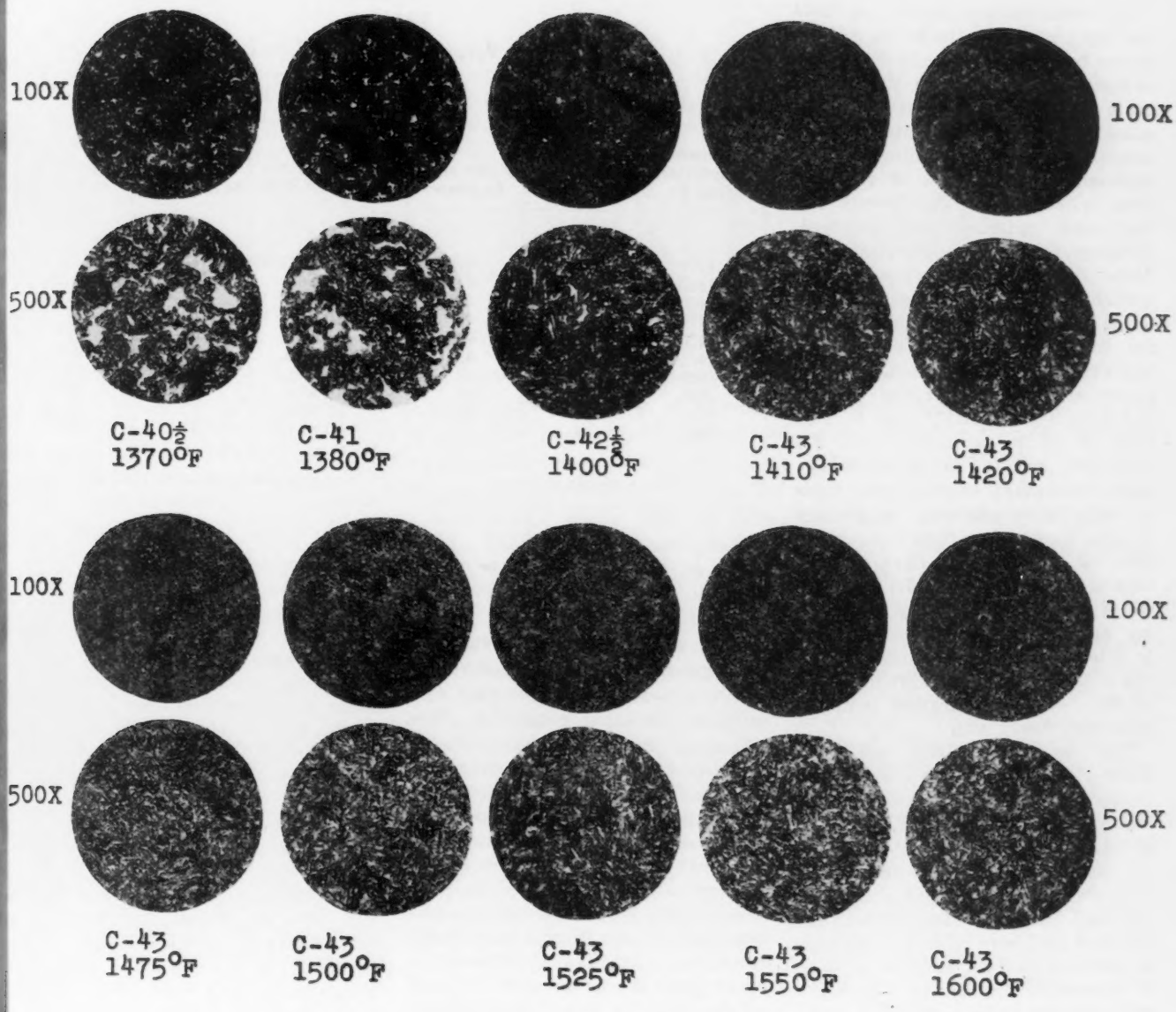

FIG. 4—Hardened and drawn structures obtained by hardening NE 8745 steel in the salt bath at the temperatures indicated, oil quenching and drawing at 775 deg. F. for 2 hr. Time in salt bath 8 min.

fast heating rate of salt baths and a practical margin of safety when using 5 min. at heat in hardening the operating slides. Therefore the final heat treatment specifications read like this: Heat in a neutral salt bath at 1500 deg. F. for 5 min. at heat, and not less than 8 min. nor more than 15 min. total time in the bath.

It is desired to keep the heating time in the so called neutral salts to a minimum, due to the decarburizing and steel heating characteristics of all of the potassium chloride, sodium chloride mixtures with or without rectifiers. Oxides in the bath make them slightly decarburizing and the acid forming tendency of the salt etches the steel away like a mild pickling process. More information about the properties of these potent materials that it is sometimes necessary to use may be obtained from the du Pont laboratories. An explanation of the reactions in these salt combinations would be outside the scope of this paper, even if it were known what they were. The writers are confined to the use of these salts of which a few different brands have been tried and one thing is certain: That if a piece of steel is kept in them long enough, such as the fixtures for hardening the parts, the steel will gradually disappear.

It is also desirable to keep the hardening temperature as low as possible consistent with good hardening, as this decreases the tendency towards decarburization and grain growth. Although grain growth is not a serious problem with alloy steels, all the way up to 1600 deg. F. and even higher, there is no point in using a temperature as high as 1600 deg. for it only leads to increased operating troubles and less desirable physical properties. It would not be advisable at this time to use a hardening temperature below 1500 deg. F. for N. E. 8745 steel.

In the actual hardening operation the parts are hung on hooks, as shown in Fig. 2. The furnace is loaded with five racks and the temperature of the salt drops. The time for recovery of the temperature in the salt bath to 1500 deg. F. is longer than the time required to bring the parts up to the temperature of the salt. Therefore, as soon as the salt bath reaches 1500 deg. F. a 5-min. heating period is allowed for obtaining a uniform austenitic structure. The parts are then removed from the salt bath, drained for a few seconds to remove the excess salt and the operator turns to vigorously oil quench the parts in a tank opposite the furnace.

To obtain uniform hardness on both the light arm and the heavy section in the body of the slide, it was found necessary to agitate the slide vigorously back and forth sideways in the quenching oil. This agitation was more important in obtaining uniform hardness than the type of oil used. Even with the new fast quench oils the same agitation was required. However, for these small parts it was found that the more expensive fast quenching oils were not required. The oil in use for hardening this part and for the determinations in this test is a paraffin base oil with Saybolt viscosity of 106.0 sec. at 100 deg. F. and a flash point of 375 deg. F. This type of oil is commonly used for quenching and for many other purposes, however, of the two types available it is advisable to use the paraffin base rather than the mineral base oil, for a higher flash point is obtained with the paraffin base oil which is a desirable quality in quenching operations. The quenching tank is fitted with a recirculation system and a cooling unit to maintain the oil at the optimum operating temperature with heavy use.

The operating slides are then washed in a hot alkaline solution and drawn in a forced convection tempering furnace at 775 deg. F. for 2 hr. at heat to Rockwell C43. To insure the quality of these important parts they are inspected 100 per cent on the Rockwell hardness tester on both the arm and the heavy section in the body to see that they are within the limits of Rockwell C40 to 45. Obviously with such accurate control all of the operating slides are found to be within the specified limits.

The question might arise about the values of the physical properties other than the Rockwell hardness for the steel tested in this experiment. This has been well covered in an excellent report on "Mechanical Properties of N. E., S. A. E. and Other Hardening Steels," by W. G. Paten, published in *Metal Progress*, May, 1943. Thousands of tests are reported in this valuable statistical paper which shows that all physical properties for all heat treated steels are the same for any given hardness and that the Rockwell hardness may be used as a guide to the other properties. This, of course, assumes that the steels are properly heat treated and that they will respond to the heat treatment in the section used, and that the past history of heat treatment is such that the final structure will not include such gross contingencies of malpractice as coarse grains, banding, undue segregation, etc. On the side of differences in physical properties in steels there is another excellent work in the form of a booklet published by Carnegie Steel Co., a division of U. S. Steel Corp., entitled "Carnegie Controlled Carbon Steels." This was published in 1933 and tells the great variations in mechanical properties that may be obtained in the same grade of steel.

These variations are well known to all steel users. They can be controlled as revealed in the Carnegie booklet. More important than anything else for obtaining good physicals is the final heat treatment, including the normalizing, annealing, hardening and drawing. The scope of this paper has been confined to the hardening operation although the other three operations are performed in the writers' plant. Very often the normalizing or annealing is done at the steel mill and only the hardening and drawing are performed by the manufacturer.

To obtain physical properties consistent with those reported by Mr. Paten for any given Rockwell hardness, the hardening operation must be accurately controlled whether it is performed at the steel mill or by the company making the parts. It is hoped that the information given in this paper will not be used as an indication of error in the determination of the critical temperatures for N. E. 8745 steel, but as a guide to show how to check the quality and accuracy of that very important operation, the final heat treatment of a finished part, and to reveal the value and satisfaction obtained from successful experimentation in one's own work.

TABLE II

Hardness Values As Quenched and Drawn

Increasing Temperature

Hardening Temperature, Deg. F.	Rockwell C, As Quenched	Rockwell C, As Drawn
1370	55	40½
1380	55	41
1400	57	42½
1410	57	43
1420	57	43
1475	57	43
1500	57	43
1525	57	43
1550	57	43
1600	57	43

Time constant at 8 min.

Increasing Time

Total Time in Salt Bath	Rockwell C, As Quenched	Rockwell C, As Drawn
Before Hardening	16	
15 Sec.	12	
23 Sec.	21	
30 Sec.	44	33
1 Min.	57	42
2 Min.	57	42½
5 Min.	57	43
15 Min.	57	43
30 Min.	57	43
60 Min.	57	43

Temperature constant at 1500 deg. F.

High Pressure Water Treatment for Scale Removal

THE latest and most effective mechanical method of removing scale before and during the rolling and forging of steel is discussed by G. Wallquist in *Jernkontorets Annaler*. Water at a pressure between 1029 and 1470 lb. per sq. in. is directed through a rectangular nozzle inclined at an angle to the surface of the moving billet or bar. Centrifugal or reciprocating pumps supply the water. Most modern plants, the author reports, have one or more three-cylinder pumps in conjunction with a compressed air accumulator.

The degree of cleanness achieved can be measured by the weight of remaining scale per sq. ft. of surface, or by the percentage of initial scale removed. When ingots of 0.10 carbon steel were rolled down to thin sheets, the high pressure water treatment reduced the scale from about 4.6×10^{-4} to about 1.12×10^{-4} lb. per sq. in.

For improving the surface in the rolling of stainless steel and hollow drill steel, this water jet treatment is excellent. In the rolling of wire, the degree of reduction is great, and this in itself causes good mechanical cleaning. But in the rolling of strip, the degree of mechanical cleaning is not very high so that the water jet treatment should be valuable.

The efficiency of a cold strip was found to be considerably increased by high pressure water cleaning equipment as this removed most of the sharp oxide and slag inclusions.

UNDER THREE PLANS

. . . Now that American industry has operated under State Planning for several years as a war emergency, it might be of interest to examine some of the details of State Planning as practiced by Russia, Germany and Japan. This article contains some excellent first-hand information. The author was an engineer in Russian steel plants in the years 1931 to 1936, and later was technical advisor to the iron and steel section of the Heavy Industrial Development Corp in Manchoukuo.

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THE picture of the condition in which the iron and steel industry of the United States finds itself two years after Pearl Harbor and three years after aid was first given to the enemies of aggression, is cloudier than it has ever been in the past. Despite great satisfaction with well sustained productivity and despite a feeling that victory will surely come, if not this year then soon in the next, it is apparent that both labor and management are worrying about the day of settlement. They are worried because jobs must be found for the 500,000 now employed and for another 100,000 who will return to normal life. For over two years the industry has been living and working under an emergency variation of the great social experiment of certain other countries in a state planning of their activities. It is quite certain, therefore, that not the least of the pre-occupations of both management and worker is this one, "shall state planning be discarded or retained? What has it done and what will it do to labor and management?"

When the decision was to be made in 1941 whether or not to expand the iron and steel producing facilities of the nation and whether or not Government money would be used for this expansion, the guardians of invested private capital wrote a minority report. They opposed the expansion. They were loyal to the high ideals of private enterprise in their opposition. They stated over and over again that the existing steel and iron producers would and could produce enough for any foreseen war demand if careful control of civilian demand could be devised and administered. To them this was a big and a very unpalatable "if," since it opened the door to some sort of socialistic state control of production and distribution.

If the reader should turn back to the files of the Proceedings of the American Iron and Steel Institute for the years 1940 and 1941, he would read that the leading industrialists, the guardians of the "banker's dollar," were against the intrusion of the "social dollar" into their industry as investors, but never against the institution of some sort of Federal control of production and distribution for the duration of the war emergency. The men gathered together in New York for those meetings were conscious of the enormous task ahead and spoke as responsible men. Ten years of experience with a great depression now ending because their world was going to war had given to all men a feeling that all was not well with the "free enterprise" way of life. The national psychology of the moment was adverse to the leaders of industry. Opposed to them was a very persuasive group of "social dollar investors" plus the Army, Navy and Maritime procurement boards. The military urgency limited consideration of the question. In vain did the industrialists show that they had plowed over $2,000,000,000 back into their properties during the depression years thus enabling a production of 7,000,000 tons of steel in March, 1941, an expansion measure that had been called "expansion to the point of economic weakness" by the Temporary Economic Council a few years back.

As was to have been expected, Washington chose to expand the iron and steel industry and to ration steel to civilians. The Office of Production Management became the State Planning Board for the industry. About four different kinds of cooks were soon found to be stirring the kettles of expansion at O.P.M.—politicians, industrialists, social planners and the armed forces. Roughly speaking, the procurement experts dictated how much of what would be needed, the social planners evolved the proper socialistic procedure for getting it and the politicians and the industrialists slugged it out as to the location of the new plants and facilities. As it was necessary to have Congress appropriate the money it was wise to plan to spend it where it would please the most powerful groups in Congress. Thus it came to pass that the matter of location was more or less decided by the politician and not by the engineers or economists of the industrialists. As a result of practicing State Planning, the country has had three years of tremendous production of iron and steel. Hundreds of millions of dollars worth of additional plant capacity has been built. Some of the new plants have not even been put into operation after they were completed. Right today, the steel industry is still producing and distributing as told to do by a State Plan.

It is natural to think of the Soviet Union when State Planning is a subject for discussion. It began there and has probably functioned better there than elsewhere. Along about 1929 it became the principal bureau of that very bureaucratic nation. For the first ten years succeeding the revolution it developed slowly in inept hands, but when given over to the brilliant organizing genius of Valerian Konstantinovitch Mezhlauk it went to town, growing so great in impor-

tance, with branches in every factory and plant of any kind whatsoever, that not one article was made, sold or transported unless so planned in the previous year by this State Planning Board. Every coercive agency of government was employed to insure compliance with the plan. Deliberate evasion of the plan's requirements was considered a counter revolutionary act punishable by death. Failure of a manager to fulfill his plan was cause for removal from office. Eleven years after the U. S. S. R. began living under this rigid planned scheme of life it was found to be in adequate state of preparedness to wage land and air war on the most mammoth scale of all history.

Plants Were Man Killers

Russia's iron and steel industry in 1927 was capable of producing about seven million tons of steel annually from a number of antiquated plants scattered here and there, mostly in the Urals and Donets regions. These plants were man killers, having been laid out to use labor rather than machinery wherever possible. Some had been built by Germans, others by English and one on the Black Sea by a French-Belgian concern. There were some that had been built and operated by the Government for the army. As a rule the foreign concessionnaires had imported their own management staffs, employing the Russian born and trained engineers in very minor capacities. Hence when the first world war and the revolution were over with and the Soviets found themselves with a steel business on their hands they did not have too many highly qualified supervisors and did not trust those that they had. In keeping with their intention to give over the industries to the workers the set-up should have been fine, but they soon found out that the worker could not go it alone. So they developed a three cornered scheme of management with the engineers sitting in one corner, the trades unions in the other and the Communist Party in the third. When things went wrong, and they seldom went right, the secret police would move in and clamp the engineers into jail for sabotage. In 1928 practically the entire engineering and technical fraternity was jailed, mass tried and convicted of sabotage. They were then put back to work under the watchful eye of the political police and given a chance to prove, by five years' hard work without error, that they were good citizens of the Socialist State.

This was the set-up when the First Five Year Plan was unfolded. That plan was the result of the collective effort of the finest foreign brains working with the best scientific and technical minds in Russia, whether out on bail or not. The power and drive was furnished by the Communist Party. About two years were required to formulate this plan. Certain broad directives were laid down by Stalin and his "Polit Bureau." They were, (1) all projected enterprises must have the correct assembly of materials, the finest and latest machinery, and be given the proper processes so that in all ways the best working conditions would obtain; (2) these enterprises must be such that would gear in with the immediate plans for the national defense; (3) as the building of Socialism depended upon industrialization, these plants must be dispersed to all corners of the Union to aid in industrializing the backward peoples; (4) this First Five Year Plan must be a base for all future planning; (5) while the projects to be built under the first plan would use import machinery this plan must provide a means of home manufacture of the machinery to be required thereafter.

Various Plans Ridiculed

With characteristic realism the Russians accepted the dynamics involved, and before the First Five Year Plan was three years old they super-imposed the Second Five Year Plan upon it, and in another three years topped that with the Third Five Year Plan. This caused much scoffing at home and abroad. However, subsequent events have proved the wisdom of these moves, for by 1941 when Adolph pulled the "boner" to end all of his "boners" the Soviet had a pretty well balanced iron and steel industry capable of producing about 21,000,000 tons of steel. Those foreign engineers, such as the writer, who served in Russia during a part of this industrialization believes that State Planning was largely responsible for the success, as it is difficult to see how any order could otherwise have been secured from the chaos that bogged the nation down for years after the revolution.

Most of the foreign engineers know a great deal of the experiment in State Planning in Germany under the dictatorship of the Nazi Party, where the Soviet technique was super-imposed upon that initiated by Rathenau in a desperate effort to get Germany ready for another war. Its spirit and mechanics reek of such chauvanism and military urgency that they are abhorrent to foreign engineers. However, this also was another whirl at State Planning that should have some interest to the United States. Still another similar program was initiated by those well known imitators, the Japanese. This latter had the uniqueness to be attempted in a land where monopolistic privilge was very firmly intrenched. Necessarily State Planning collided with what goes for private enterprise thereabouts. And this fact is important to citizens of these United States.

Japanese State Planning

This Japanese attempt at State Planning was staged in the conquered territory of Manchoukuo where Henry Pu Yi is called Emperor and the Kwantung Army is called Boss. Prior to conquest in 1932, Manchuria was a region of special interest and a favorite field of investment for the "Five Families" of Japan, who controlled between them most of the banking, trading and manufacturing of the Japanese Empire. The army had long resented the strangle-hold this system had on the economy of the nation. A socially conscious group of younger officers in the Kwantung section of the army had been most active in trying to loosen the grip of these families. After taking over Manchuria they set about the creation of a brand new sort of socialistic state under the dictatorship of the Army. The brighest young brain-trusters in the Japanese Empire, such men as Iishi, Kiishi, Hoshino and Yoshino, all top-flight politico-economists and all prominent in government circles in Tokyo, got their fingers in the pie. The Army agreed to furnish the driving energy and overall direction. Next came the question of money. The Mitsuis, the Mitsubishis, the Yasudas, the Sumitomas and the Okuras had the money and they were not having some State Planning of their money, thank you. From 1932 to 1937 the story of the rise and fall of Japanese Cabinets is the story of the attempts of the Army to get not only enough money for themselves and the Navy from the Government but for this socializing scheme also.

Fortunately for the planners, the Five-Family gang, being cautious and clever, had generally rigged their Manchurian enterprises so that in case of fire, theft or international complications the good old Imperial Treasury of Japan would foot the bill. Their big racket in Manchuria in this respect was the famous South Manchuria Railway. This was a great

venture with broad territorial and jurisdictional rights straight through the heart of Manchuria from Port Arthur to the Amur River. There was not much in Manchuria that did not belong to the S.M.R. It owned the great steel and iron plant at Anshan, the mammoth colliery and oil shale plant at Fushun, the magnesite deposits of Tashi-chao, and practically all harbor and terminal rights in the country. It operated big hotels, marketed soy beans and engaged in farming in a big way. Whenever the busy little brown men of the Army had driven the Chinese guerillas back from a region the S.M.R. was first in the field with surveyors and geologists.

China Invasion Opposed

This was finally the honey tree that furnished the sweetening for the State Planners. They cut it down in 1937, stripped it of limbs, leaves and bark, and piled all of it neatly with the label, "Assets of the Government of Manchoukuo in the State Planned Heavy Industrial Development Corporation." Now they had their plans and some money, but not management. For this they went to Japan and persuaded Yoshisuke Aikawa, the head of the Nissan Industries—a big merger of about everything in the Empire not under Five-Family control—to toss the assets of his enterprises into the pool for a guarantee of ten per cent per annum and take charge of executing the plans of the planners. Aikawa was quite a remarkable men. He was very strongly opposed to the invasion of China in 1937. His statement of policy at this time was, "If the Army knew all that I have done to try to bring an end to this silly war in China they would cut off my head. I have seen three wars. They have the same after history. First, we have a great business activity. Then, we have a prolonged depression. I have my plans all made now to turn the hose of our national energy, which at present is draining everything we have into China, into Manchuria, where we shall build and not destroy."

At this point it is interesting to note a certain dissimilarity in the conditions attendant on these various forays into State Planning. The Soviet Union had to go abroad for its machinery and possessed the necessary money as a state for its purchase. United States, possessing practically all of the world's money, also possessed the best machine building industry. Manchoukuo had to get practically every bolt and nut from without her borders and had no money in cold storage that was useful as foreign exchange. In order to get this money it was necessary to find buyers with gold for the 3,000,000 tons of soy beans and the hairs, hides, bristles and sausage casings that made up the export business of the territory. Normally the soy bean went to Germany and the balance to the U. S. This exporting and the importing of the stuff purchased with the export money had long been in the hands of the Five-Families. They never relinquished this business and so had the pressure constantly applied.

Foreign engineers saw these planners and their Army directors squirm from plan to plan in the years 1938, 1939, 1940, and 1941. Also seen was the decline each year of the production of coal, iron ore, iron and steel. Also seen was the gradual addition of some plant facilities which had been ordered by the companies in existence prior to beginning of planning, but no increase of production therefore. Many little companies, all stemming from the big one, were created by the planners. All of them were seen to go back to the parent for more working capital and finally the papa company had to go to Tokyo in 1941 for recapitalization.

Conditions Not Bettered

The dismal failure of the Manchoukuon State Planners to better conditions cannot be charged entirely to obstruction by private enterprise nor to the ineptness of the planners. The world war blockade of Germany plus the U. S. embargo on export of machinery to Japan forced Manchoukuo to depend entirely upon Japanese industry for the machines needed. At this time China was bleeding the Japanese Empire white. Over and above these obstacles there was a glaring fallacy in the conception of this undertaking. The Jap in Asia simply could not think in terms of creating wealth. He lost himself in planning to take away wealth. Not one Jap of the millions that swarmed over Asia from 1932 to 1941 ever entertained a sincere desire to make the 30,000,000 Manchu people useful in the use of the useful things that might be found among them. Each and every one of those little brown men, whether he worked in the planning bureaus of Hsingking, or in the counting houses of the Five-Families, concentrated on getting something quickly out of it all for himself and getting back to the homeland. The legend of "The Golden Kimona" explains the failure of the Japanese there and elsewhere. According to it, a young man from the paddy fields one time ventured into a foreign land. He amassed great riches and one day returned to his native village. He bought a golden kimona and sat thereafter resplendent among his elders.

Poor Japanese Policy

If in 1933 these conquerors of Manchuria had set themselves down as wise men of good intent and had dedicated their future to the creation of wealth in Manchuria in the ways that wealth is created, they might possibly have justified their intrusion. Instead they deliberately set out to "kill the goose that laid the golden egg." None of their plans ever called for the participation of the Manchu people, a tall, slender likable and capable people, in the industrialization of their own country. Rather, each planned enterprise must be staffed with imported Japanese down to the common labor categories. Common labor would be done by the Manchu who would get the same pay, the same working hours and the same living conditions as had in the past been given to coolie labor. The Manchu would have none of it. He either stayed on his farm or else ran away through the Great Wall into China. Common labor in an un-mechanized land is, in the mass, the most important item in the cost sheet and the greatest factor in production. Since the Manchu did not collaborate with the planners they had to bring in hordes of coolies from the apparently inexhaustible reservoir of manpower in Shantung Province. These people lived on nothing and sent their wages back to the home folks. This constant drain on the exportable funds of Manchoukuo plus the cost of what little machinery was being imported upset the Yen so badly in the occupied zones of China that a law was passed prohibiting these remittances. The coolies "he also runaway," and the state planners were short of both men and machines. The two new blast furnaces at Honkeiko, or Penshishu as it was known when the Chinese owned it, lay idle in 1941 because it lacked machinery to mine the coal nearby. The four new blast furnaces at Anshan were muddling along at 60 per cent of capacity because labor could not be found to mine the coal at the completed mines of Peipao and Tung-piento, or shovel the ore into the cars on the benches of Taikozan.

Neither Honkeiko nor Anshan had

(CONTINUED ON PAGE 148)

Porous Chromium Plating

FIG. 1—To assure smooth finishes on corners and edges of the liners so as to avoid "treeing" of the chromium in plating, corners at the ends of the barrels and at various ports are ground to a slight radii.

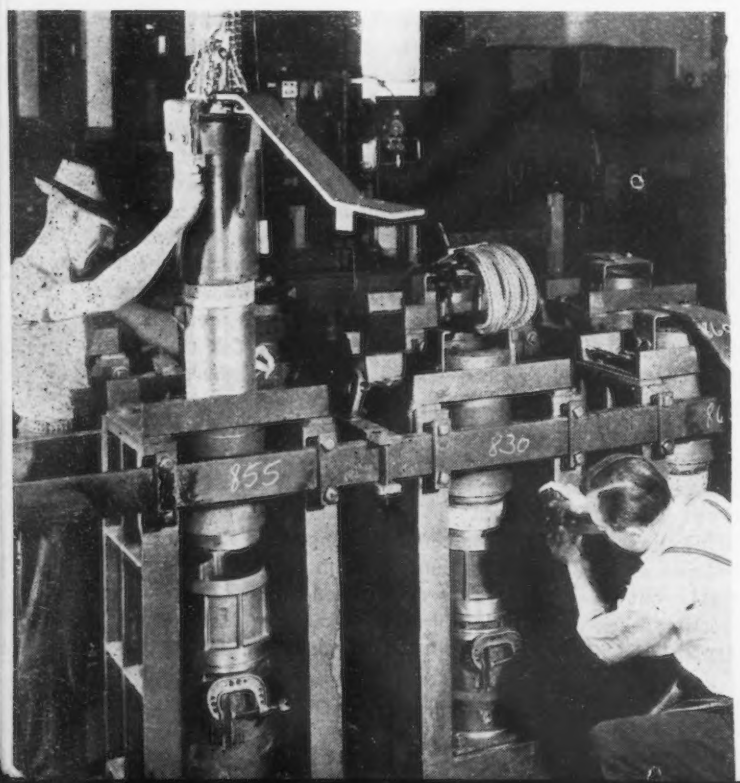

FIG. 2 — Cylinder lines are rigidly mounted and anodes are positioned vertically through them. The fixture design is such that the liners are held firmly and the anodes are positioned to meet the plating needs of the liner.

ELECTROPLATING, once confined largely to the decorative arts, has emerged as an essential war industry through what is known as the Van der Horst process for applying porous chromium to cylinder surfaces, with the result that engine cylinder life has been increased from 400 to 2000 per cent.

Unlike the decorative chromium plating of automobile bumpers, headlights, and the like, which requires some 0.00002 in. thickness, the Van der Horst process of applying porous chromium on the cylinder liners of diesel engines for Navy submarines, destroyer escorts and similar craft, builds up the material to 0.010 to 0.030 in. on the diameter, depending on cylinder size.

In further contrast to ordinary electroplating results, the finish of porous chromium has microscopic pores, occupying any specified range within 18 to 54 per cent of the entire plated area. The importance of these pores is that they fill with oil from the crankcase of the engine and retain it, covering the cylinder surface with a protective film of lubricant. Cylinder liners so processed have not only an extremely hard and wear-resistant surface but, by reason of their tiny oil reservoirs, are practically self-lubricating.

The production sequence by which cylinder liners for the Navy's diesel engines are Porus-Krome processed at the Cleveland plant of the Van der Horst Corp. of America begins with the method of receiving inspection. The liner castings on arrival are stored for 24 hours to bring them to room temperature.

Each liner is die-stamped with a serial number and tagged. The tag provides for a permanent and individual record of the condition in which each liner was received and the result of each phase of the subsequent process. After visual inspection for flaws and defects, the liners are classified according to inside micrometer readings.

Although plating can be done to contour, the Van der Horst plant is set up on a quantity production basis, which necessitates rejection of all

Diesel Cylinder Liners . . .

liners which "mike out" to more than 0.001 in. out of round and taper.

Next step in handling the liners is to smooth the edges of the intake port openings with a pneumatically operated abrasive tool to give them a radius of $\frac{1}{16}$ to $\frac{1}{8}$ in. This prevents abrupt termination of the chromium at port edges, allowing it to taper out in thickness over the radius of the edge and protects the base metal at this point from corrosive combustion acids.

. . . Plating cylinder walls with a thick layer of hard chromium, applied by a process that leaves the plated surface in a porous condition, has increased cylinder life as much as 2000 per cent.

o o o

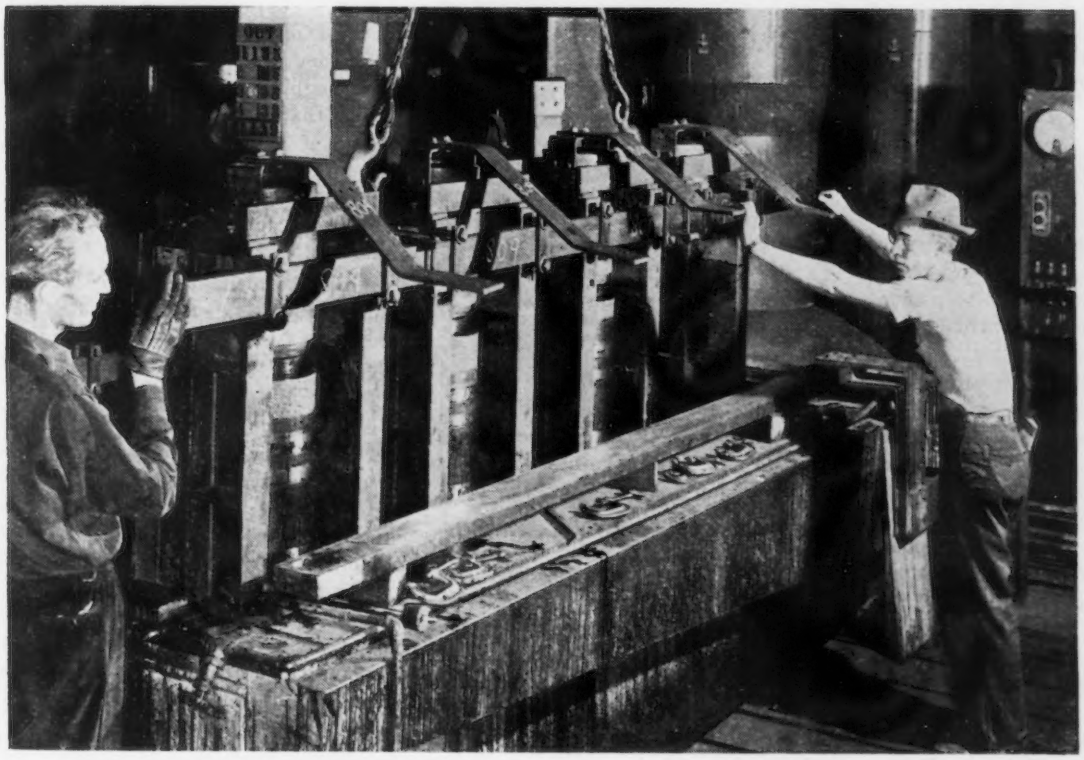

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FIG. 3—These cylinders, mounted in the fixtures, are given a chromic acid etch, prior to plating, so that the surface to be plated is thoroughly cleansed and conditioned. Here they are being placed in the plating tank. Electric controls permit individual handling of each cylinder.

o o o

An interesting phenomenon of electrolytically deposited chromium is that it tends to build up or "tree" on any rough edge or sharp point on the surface being plated. The current tends to stray to such a point from the area immediately adjacent to it, with the result that chromium is stacked up in a minute structure that resembles a tree. It likewise is to avoid this result that port edges in the liner castings are carefully smoothed.

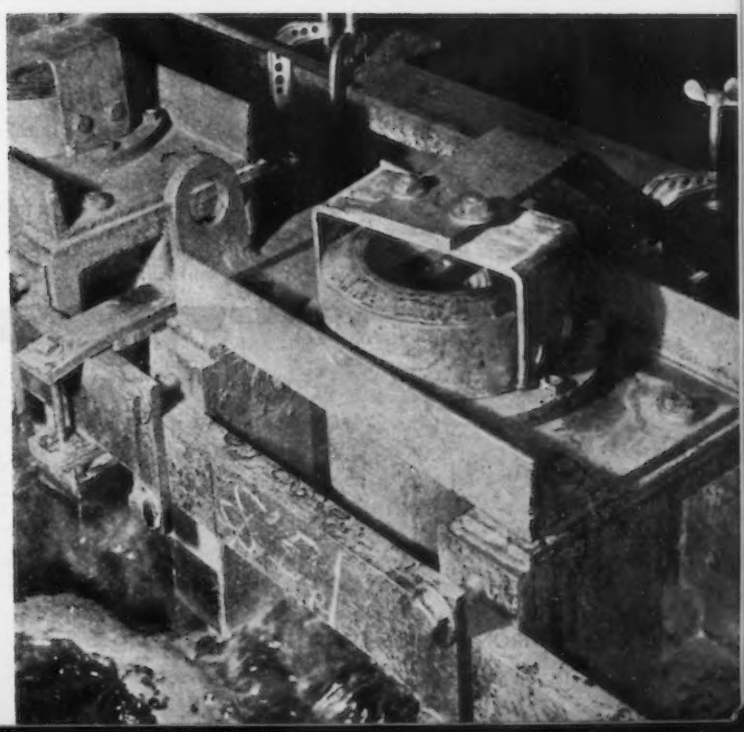
The liner ports themselves are then painted to seal them from the cur-

o o o

RIGHT

FIG. 4—In plating, the electrolyte is constantly agitated so as to insure even distribution and uniformity of the plate, as well as speed up plating time.

o o o



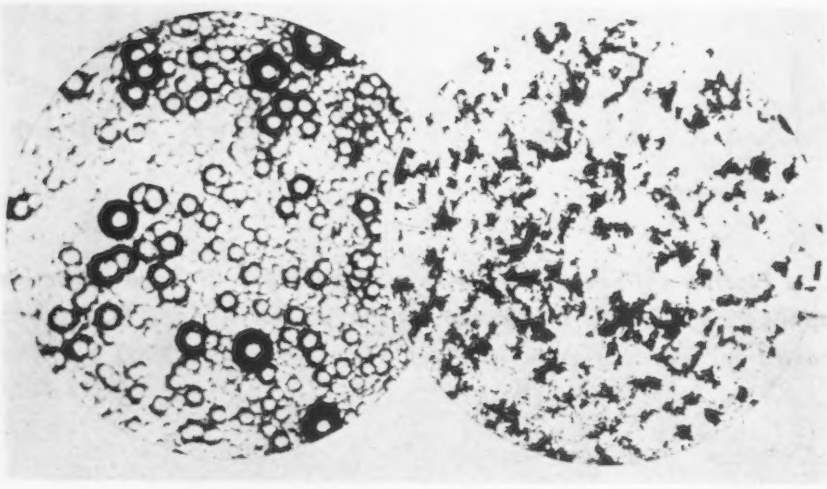


FIG. 5—To show the characteristics of porous and non-porous chromium plating, these photomicrographs were prepared. At left is a sample of dense, non-porous chromium, unhoned, while at right is a honed Porus Krome surface. The open network, the dark areas of the Porus Krome surface, forms oil reservoirs for better lubrication of mating parts.

rent during electroplating. The lower or crankcase ends of the liners likewise are painted for the same reason.

Preparatory to actual plating, the liners are grouped according to their inside diameters, an average tolerance of 0.0005 in. governing inclusion in each group. Thereafter, they are assembled in special fixtures in which they are handled in groups of two to eight, depending on the number of a given size that can be accommodated in the electroplating tank.

The base of each fixture is a U-shaped structure with parallel sides held in vertical position by channel iron stringers or castings bolted to flange plates at the top of the U. The bottom of the U structure is counterbored to receive the outside diameter of the head end of the liner.

A bushing, set in an opening in the flange plate bolted to the top, receives the anode and alines it with the axis of the liner. This bushing, integral with the top, provides for self-alinement, since the fixtures are designed to accommodate given sizes of liners.

The anodes consist of a steel core sheathed in lead 0.5 in. thick, and extend from the lower end to approximately 1 in. above the liners. The anodes are tapered, the degree of taper controlling the thickness of the electrolytic deposit of chromium.

The liners, as mounted in these fixtures, have their port holes closed off by metal collars clamped around such openings, and the fixtures themselves are painted to protect against reaction when immersed in the electrolyte.

In the groups two to eight, the liners are hoisted by overhead electric cranes and lowered in the first tank for an electrolytic etch in chromic acid solution of two amp. min. Current to the anodes is 10,000 amp. per tank, regulated to supply from 3.5 to 6 amp. per sq. in. of plating surface. Size of the tank, strength of the solution, and current are fixed to accomplish the desired result in a given time in relation to a given surface to be plated.

The initial etch serves to cleanse the plating surface and is carried to the extent of providing a surface condition that insures mechanical bonding in addition to electrolytic adherence.

Again handled by overhead cranes, the liners are hoisted from the tank and lowered into the plating tank, where chromium is deposited on the inside diameter. The electrolyte, in this instance, contains chromium in two valences (trivalent and hexavalent), sulphate, water and the usual traces of other elements. The solution is maintained at 140 deg. F. with gas heat and a water jacket, the tank being provided with air agitation to circulate the solution and keep temperature uniform.

Direct current, either generated or rectified, of 10,000 amp. at 6 v. is used throughout a predetermined period to accomplish results in relation to age of the solution, size, and requirements of the job and other variables. Average usage indicates about 15 amp. hr. per sq. in. of surface are needed to deposit 0.015 in. on the diameter.

While the ultimate plated thickness must result in an inside diameter that makes up for the oversize bore of the liner, the actual thickness deposited is in excess of this requirement.

The plated liner is then returned to the etching tank for anodic treatment to induce porosity in the chromium surface. For this purpose, the current is reversed for approximately 24 amp.-min. on the size of liners being handled at the Cleveland plant of Van der Horst. The chromium removed by reversal of current is not accumulated on the cathode but is absorbed in the solution.

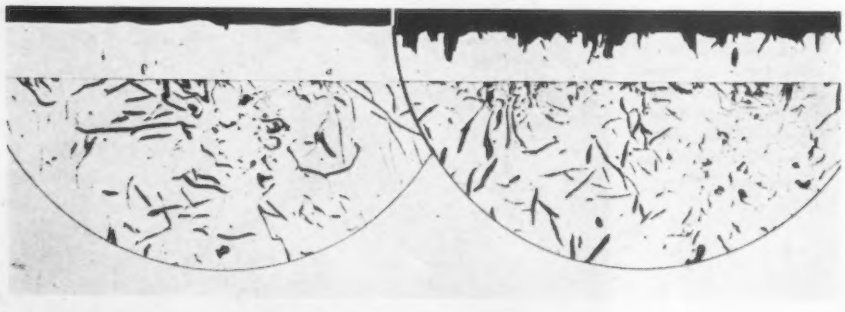
After a 24-hour normalizing period, the plated liners are inspected, surfaces of the inside diameter being checked and examined by microscope under fluorescent light to determine extent of porosity induced.

It is worthy of note that not only the percentage of porosity per square inch but the depth, structure, and size of individual pores can be controlled during the anodic process.

In actual work, porosity is divided into two structural classes. One is known as "pocket" porosity, with the pockets occupying the percentage of surface specified. The other is known as the "channel" type. This latter is the surface condition preferred by the Air Force in aircraft engines that operate at high BMEP.

These two types of porosity differ in the final honed and finished cylinder surfaces in that the pockets in "pocket" type porosity are surrounded

FIG. 6—At left is an 0.004-in. thick cross section of a chromium deposit on cast iron. The surface is level and dense. At right is a Porus Krome plated surface. The crevices form oil reservoirs, and the plateaus are honed to provide a true bearing surface.



by plateaus of dense metal, whereas in the "channel" type, these plateaus are themselves surrounded by a veinwork of interconnecting channels.

Of interest, too, is the fact that any internal flaws in the liner castings are revealed in the electrolytic results in the same manner as they appear under magnetic inspection, except that such flaws are represented by greatly magnified indications in the chromium formation.

After porosity has been induced, the liners are honed to finish the inside diameters to required size. Vertical hones are used, which are manually set to meet tolerance requirements of —0.000 to +0.003 in.

The liners then are carefully cleansed and edges of the port openings again are touched up with pneumatic tools to make certain they are neither rough nor high. An internal polisher is used to refinish the port section and the chamfer and taper at top and bottom of the liners.

This completes the production sequence by which cylinder liners for the Navy's diesel engines are processed in quantity by Van der Horst. The extent of such processing is indicated by the fact that this plant, of the three now operated by the corporation, applied in excess of 80,000 cu. in. of chromium by this method between the time it was brought into operation early in 1943 and the end of that calendar year.

FIG. 7—The thickness of the porous chromium plating is gaged, cylinder liner dimensions are accurately checked, and the surfaces and porosity of the plated surfaces are examined in final inspection. Here the inside diameters of the liners are being miked.

Iron-Silicon Alloys

IRON-SILICON alloys of high initial permeability induced by metallurgical pretreatment are discussed by F. Pawler in "Archiv für das Eisenhüttenwesen," who states that the use of high percentage iron-nickel alloys was first practiced some 20 years ago, in long distance communications technique.

Resulting from American developments in this field, the use of iron-nickel alloys with 40 to 50 per cent nickel became standard practice, in those cases where a high initial permeability was desired. Some years later, these alloys were displaced by Permalloy, discovered by G. W. Elmen, which was characterized by a particularly high initial permeability. Independently of this discovery, about ten years ago, M. Kersten found from theoretical considerations that the initial permeability to be expected from pure iron, lying at about 16,000, in the case of iron-silicon and iron-nickel alloys must lie within the range of from 6,000 to 10,000. While at present the initial permeability values of the iron-nickel alloys, practically attainable, closely approach the highest theoretical values, in the case of the iron-silicon alloys there is a difference between the theoretical value and that actually attained practically of some 10 per cent. This is in spite of numerous experiments which have been conducted, to improve the electrical properties of iron and of iron-silicon alloys by special preparation and specialized processing technique. P. P. Cioffi found that improvement could be made with commercial alloys by subjecting them to a high temperature in an atmosphere of hydrogen, under pressure. He was able to produce iron of an initial permeability of 14,000, close to the theoretical value.

The present work was conducted on strip steel of high purity, containing about 3 per cent silicon, and consisted in annealing experiments conducted in different atmospheres, with the object of achieving the highest possible initial permeability, different temperatures being investigated with various atmospheres. An increasingly favorable effect was observed with an increasing handling temperature, and a depression in the permeability curve was found with treatment in a hydrogen atmosphere, which contained small amounts of nitrogen or carbon monoxide. An increasing content of nitrogen and carbon monoxide, strongly depressed the permeability value, while heating in an atmosphere of pure hydrogen, or in vacuum, for definite periods at suitable temperatures produced the highest initial permeability. A preliminary oxidizing treatment before the vacuum processing appeared to be particularly advantageous. Experiments conducted on the usual commercial iron-silicon alloys produced equivalent results.

. . . Diamond Turning

EMPHASIS on the quality of surface finish on a large variety of engineering components has led English manufacturers to finish machine such parts as pistons, bearings and commutators with diamond tools. Until recently the only way of assessing the merits of finely finished surfaces was by visual inspection, admittedly unreliable, but the installation of surface measuring apparatus in a British factory having many years experience in diamond turning has made it possible to carry out a general investigation into the factors governing the quality of surfaces turned with diamond tools. The results are summarized in a recent edition of the British journal, *Aircraft Production.*

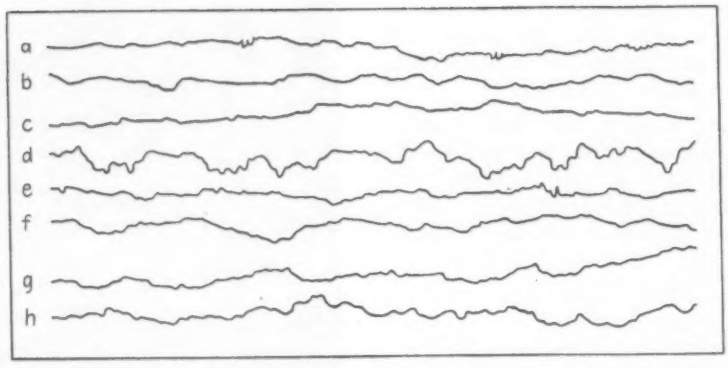


FIG. 1—Profilograms of piston surfaces made with Talysurf equipment. The average finishes (in micro-inches) represented about as follows: (a) 1⅛; (b) 1½; (c) 1; (d) 2¾; (e) 1½; (f) 1½; (g) 1¾; (h) 2. The magnification is 40,000 vertically and 200 horizontally.

Profilograms were obtained graphically on finish turned aluminum pistons, using the Talysurf, an instrument made by Taylor, Taylor & Hobson, Ltd., and similar to the Brush surface analyzer made in this country. Readings of both scale and graph are made in micro-inches. In the preliminary experiments it was found possible to produce a diamond turned surface having an average meter reading of only 1 micro-in. It was evident, however (See Fig. 1), that the average meter reading did not alone give sufficient indication of the character of the surface and it was necessary to take into consideration the total spread of the graph. This is termed the "straddle." In Fig. 1, for instance, curve *a* has an average meter reading of 1⅛ micro-in., but a straddle of 20 micro-in.

In the light of the initial findings, it was decided to make a series of tests to obtain fundamental information regarding the surface finish obtained with diamond tools and to determine the effect of some of the main variables on the quality of finish obtained.

There were three main criteria to be considered—a low average meter reading, a good graph and a good visual appearance. The second is difficult to define since there is no available information on the effect of the general character of a surface. It was, however, considered prudent to try to keep the total spread or straddle of the graph within limits and those containing sharp peaks were considered less desirable. A good visual finish was aimed at, because it was thought that provided the other two characteristics were good, a mirror finish was preferable to a matt finish.

If surface finish within a few micro-inches of perfection is desired. the tool must be lapped to the same degree of perfection. Further, the tool must be correctly set to obtain the best result. Lapping of the tools is a matter for the tool manufacturer, and the closest cooperation between tool manufacturer and user is essential in order to obtain the desired results.

The results described in this report were obtained from machines satisfying the following conditions: (*a*) freedom from vibration, (*b*) a precision-lapped spindle running in properly fitted plain bearings, (*c*) accurate endwise location of the spindle, (*d*) correct mounting of the machine, (*e*) motors mounted independently, (*f*) drive by endless belt with the minimum of tension but without slip, and (*g*) minimum of gearing in the machine. The machines are normally running on production and no alteration or adjustment was made prior to the tests.

The Tests

A number of exploratory cuts were made on aircraft pistons made mainly of wrought aluminum alloy RR59. Later, four production runs, each on 100 pistons, were made with different tools. (See table.) Graphs were made of all the surfaces produced, and in every case the maximum magnifications of which the instrument is capable were employed, *i.e.* vertical 40,000 X, horizontal 200 X.

Individual cuts taken with tools coming within four groups, Fig. 2, confirmed the experience of the past, that the best results can be obtained with a tool having a facet set parallel to the work, thus eliminating tools in Group (a). Tests with the tools in Group (b) indicated that a facet having a width of approximately 0.02 in. gave the best results. Tests on tools in Group (c) showed that the removal of the sharp corners from the ends of the cutting facets improved the results, and the results from the tools in Group (d) having a perfectly blended radius were equally good. The tools in Group (d) showed up to advantage, in that they were less susceptible to small departures from the strictly parallel setting mentioned later.

The four production runs were then undertaken, the first and second runs being made with tools of Group (b) having 0.02-in. cutting facets. The third and fourth runs were made with tools of Group (d) having 0.02-in. cutting facets. The first and third runs were made on one type of piston and the second and fourth runs on a different type, but made from the same alloy. The results are shown in the table.

Cutting Data

Although there is a widely held theory that diamond turning should be performed at the maximum possible speed, the tests indicated that for each machine and set-up there is a definite limiting speed at which un-

To Micro-Inch Finish . . .

steadiness or vibration sets in. This vibration period is determined by the inherent characteristics of the machine (and is likely to vary between machines of the same make and type) and those of the fixture and work. As an example, two apparently identical lathes could be run at 1400 and 1600 r.p.m. respectively when operating on one type of aluminum piston, but a change to another type of piston, involving also a change of fixture, necessitated reduction of speed to 1000 and 1200 r.p.m. It was found that at or above the critical speed the surface meter readings and the visual finish deteriorated.

Feeds between 0.0009 and 0.0048 in. per rev. were tried, and no deterioration in surface finish resulted in using the coarsest feed when the tools were correctly set. Feeds of 0.0014 to 0.0035 in. are being used on production.

With diamond tools the depth of cut must always be reasonably light to avoid fracture. Tests were made taking cuts between 0.001 and 0.006 in., and no appreciable difference in the surface finish resulted. Cuts of 0.001 to 0.003 in. are being taken on production.

Tests were carried out using lubricating oil, soluble cutting oil, paraffin, airblast and dirty oil as coolant. The changes did not have any noticeable effect on the surface finish. In production, just sufficient soluble oil is used to keep the tool edge free from any tendency to accumulate slight particles of metal.

Conclusions

The tests provided interesting data which are summarized below. Some of the recommendations are based on

. . . Results of experiments carried out in England indicate that aluminum aircraft pistons can be turned with a surface finish of 1⅛ to 2¾ micro-in. when diamond tools of proper shape and finish are employed.

previous experience which was confirmed by the tests:

(1) Visual judgment of surface finish may be very unreliable.

(2) Machines should be properly mounted and all possible steps taken to

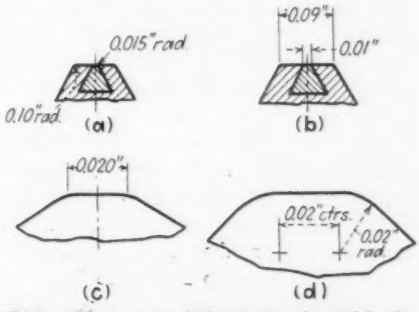


FIG. 2—Four types of diamond tools used in the tests. (a) Tools having nose radii varying from 0.015 to 0.10 in.; (b) tools having a front facet varying from 0.01 to 0.09 in. width; (c) tool incorporating a front facet with the sharp corners removed, and (d) tool with a front facet blended into radii.

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eliminate vibration. A correctly mounted spindle is essential. Plain bearings are preferred.

(3) A tool with a perfectly polished cutting edge is essential; no fault should be apparent at 100 magnifications.

(4) Care and patience are necessary when setting the tools. They should be on or slightly above center, and if a tool with a facet edge is used the facet should be set parallel to the work.

(5) Cutting speeds should be below the natural vibration frequency of the machine, fixture, work, etc.

(6) Within limits, feed and depth of cut have little effect on the quality of the surface finish.

(7) While coolants do not appear to exercise a very great influence on the results, it is desirable to use some form of coolant to keep the cutting edge of the tool free from chips, which should have a smooth silky feel.

After a detailed study of the results, it was decided to introduce standards of surface finish on production at this factory. Limits of average meter reading 3 micro-in. maximum and straddle 25 micro-in. maximum were selected, and no difficulty has so far been experienced in maintaining these. Some of the tools used in the production runs have now been in continual operation for three months without exceeding these limits.

Notes on Tool Setting

When setting faceted tools the aim of the setter should be to set the diamond to run with the cutting facet as nearly parallel to the work as will produce the required result. If possible, the diamond should be optically set, but if the necessary apparatus is not available, the diamond can be set by eye. An experimental cut will show by the manner in which the cut widens out in which direction the setting is faulty. This can also be checked by rubbing the finger with and against the direction of the feed; the "feel" should be the same either way. If after setting the facet parallel with the work the finish is still below requirements, the effect of altering the height of the tool should be tried.

For those who have no means of measuring surface finish, two useful tests are available. If the machined surface is rubbed with thin paper (cigarette paper) a poor surface will produce a thin whistling sound, whereas a brilliant surface with a low micro-in. reading will produce practically no sound. A stethoscope with half of a ping-pong ball fitted to the applicator end to act as a diaphragm may also be used to measure surface roughness. The edge of the diaphragm is rubbed lightly across the machined surface and the volume of sound produced gives a good index of the quality of the surface.

Meter Reading Compared with Total Deviation on Graph (Straddle)

Test Tool		Finish on 1st Piston		Finish on 100th Piston	
		Average Meter Reading Micro-In.	Straddle Micro-In.	Average Meter Reading Micro-In.	Straddle Micro-In.
1st run	(b)	1½	20	2¾	22
2nd "	(b)	2½	20	1½	17½
3rd "	(d)	1⅛	20	1½	16
4th "	(d)	1½	15	1¾	20

Results of the first four piston production runs.

Mass Production of Fine Pitch G

. . . By accurately controlling the blank dimensions and the roughing operations on the teeth, it has been found that shaving gives a sufficiently smooth and accurate finish to eliminate the necessity of burnishing. Pitch diameter tolerance on these gun director gears is 0.001 in.

EXTREMELY high standards of accuracy heretofore obtainable only on a custom built basis are being applied in the mass production of fine pitch gears by the Ford Motor Co., Detroit. The gears are used in the mechanism of an automatic anti-aircraft gun director and upon their precision depends the accuracy of fire control. There are some 750 gears in each gun director.

To attain the goals of high precision and mass production, the Ford Highland Park plant developed a production and checking cycle somewhat unique in precision gear manufacture. The process was built around the use of relatively unskilled labor, and furthermore the same equipment is used for finishing all gears from ¼ to 4 in. in diameter. The finished gears are held to 0.0003 in. on the bore of the gear with a specification of 0.001 in. on the pitch diameter and close accuracy for tooth form and spacing. Actually most gears come off the shaving machines within one half-thousandth on pitch diameter. Fig. 1 shows the fixture used for checking the pitch diameter.

All gears are of the spur type and run from 32 to 64 pitch. Some are less than ½ in. in diameter and many have only 9 or 11 teeth. They are made from either duralumin or stainless steel and are blanked from bar stock on screw machines with a tolerance of 0.001 in. on the o.d. being maintained in this operation. The blanks are then precision bored on Boremastics, tooled with cemented carbide tipped tools to facilitate holding the bore of the blanks to the required tolerance of 0.0003 in. in continuous production. The minimum face run-out is also of extreme importance, a tolerance of even 0.001 in. per in. in radius being too much for these gears. In production most of the gears average around 0.0005 in. in face run-out.

Shaping and Finishing Gear Teeth

For roughing the gear teeth, hobbing machines, gear shapers and straight line gear generators are used. All gears of less than 1 in. diameter are roughed on the gear generators. The general practice for the larger gears is to employ class A Mitco hobs in order to obtain the maximum degree of accuracy before the parts go to the gear shaving operation. In all of the roughing operations, the amount of stock left to be removed by the finishing process is held to 0.002 in. or less, measured over wires. This means that gears are hobbed to the *high* limits permissible for finished gears and then are shaved to the *mean* for the final gear tolerances. Fig. 2 shows how such small gears are hobbed by Ford on Barber-Colman Type S hobbing machines, the actual photo, however, having been taken in the Barber-Colman plant.

In shaping these small fine-pitch gears prior to the finish shaving process, perhaps the most difficult job is the setting up of the machines to obtain the extreme degree of accuracy

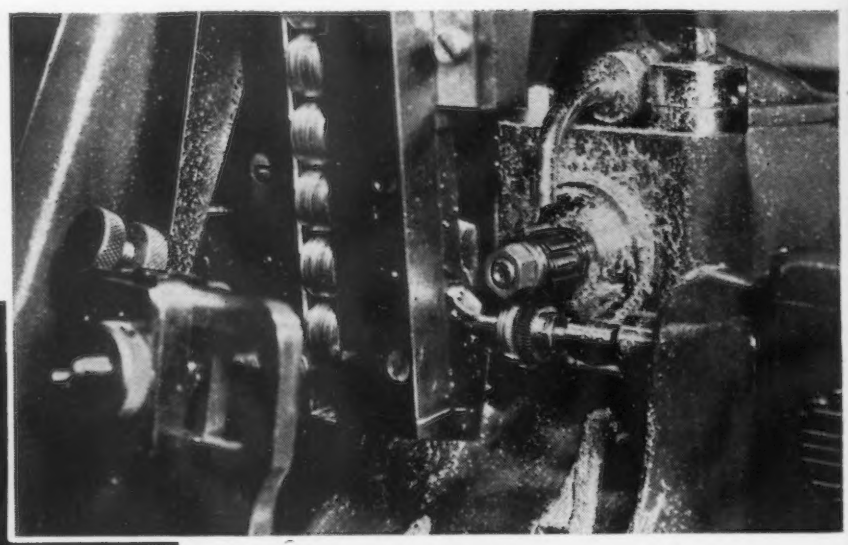

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FIG. 2—"Roughing" small gears on this hobbing machine. The amount of stock left for the shaving process is held to 0.002 in. (Photo courtesy Barber-Colman Co.)

LEFT

FIG. 1—The pitch diameter is held to 0.001 in. and checked with wires in this fixture.

Gears . . .

required. Arbors must run true and for this reason floating arbors are used on the shapers, Fig. 3. It requires 6 sec. to shape one tooth, and the accuracy of tooth form (prior to the finish shaving) equals the accuracy of conventional finished gears.

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FIG. 4—Gear shavers are used to produce a precision gear. A special "run-out" checking device is used on a 100 per cent of the finished gears and is shown at the left of the machines.

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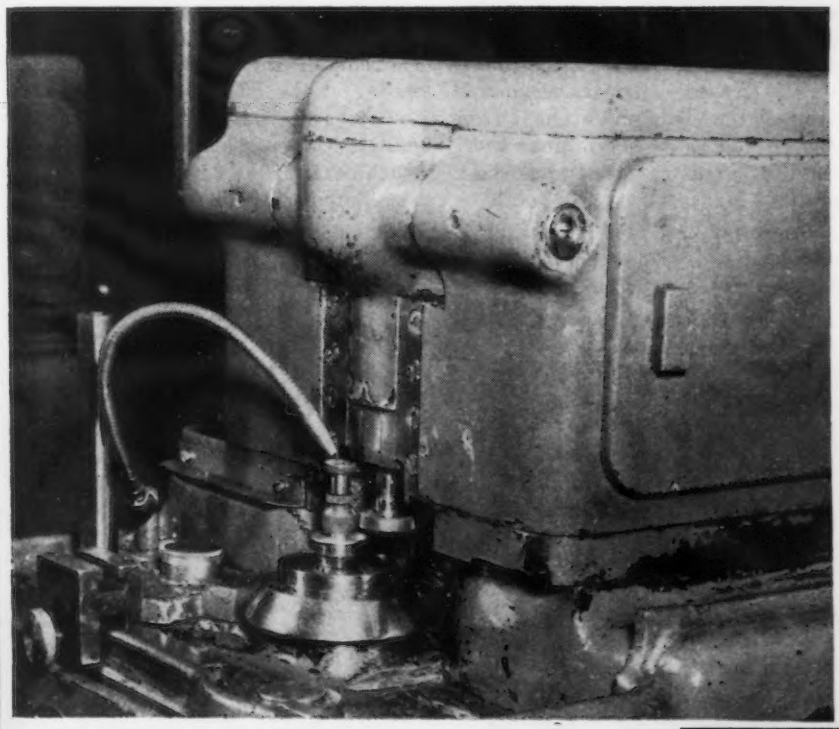

The gears are finished on a battery of ten Michigan 861-4B gear shavers, part of these are shown in Fig. 4. These gear shaving machines make use of the crossed-axis principle of gear shaving in order to obtain a cutting action between the faces of the serrated cutter and the gear to be finished. Gears are mounted on arbors between centers as shown in Fig. 5. In the finishing operation, the cutter drives the gear first in one direction and then in the opposite. In this manner, the face of the gear is moved across the contact area of the cutter, while the center distance is gradually reduced to bring the gear to the desired size. It requires about 1 min. to finish the average small fine pitch gear in this operation.

To maintain a high degree of accuracy a special checking device has been developed by Ford Motor Co. This device, shown to the left of one of the shavers in Fig. 4, checks the finished parts for run-out in the pitch diameter against a master gear. Maintaining a constant and correct amount of pressure between the gears is of extreme importance and is obtained by mounting the gear to be tested on an arbor on a sliding block and rotating it in mesh with the master gear. The angle of the slide from the horizontal and therefore the amount of pressure which is exerted by gravity on the block can be increased or decreased at will. Radial movement of the test gear is measured by a dial indicator bearing against the movable block. All finished gears are checked 100 per cent on this fixture.

The finished gears are not hardened but are subjected to a chemical surface treatment for rust prevention. Originally gears were burnished after shaving, but the smooth finish as well as accuracy secured by the gear shaving machine eliminated this operation.

ABOVE

FIG. 3—A floating arbor is used on this gear shaper to obtain extreme accuracy, 6 sec. is required to shape one tooth.

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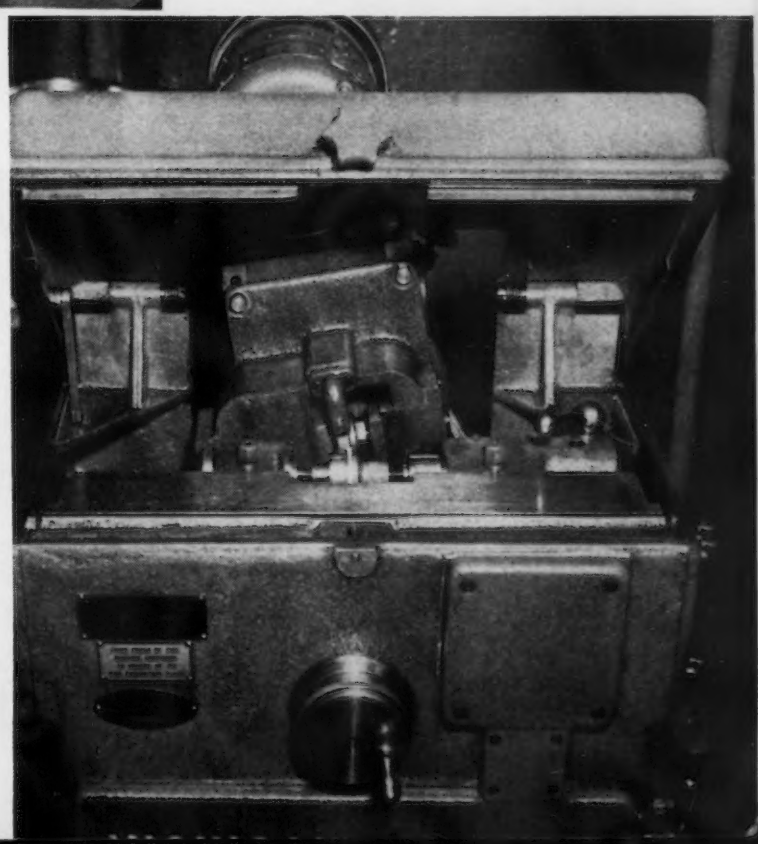
FIG. 5—A close-up of a 48 pitch gear being finished on a shaving machine. This operation produces a very smooth finish which eliminates burnishing.



Abrasive Belts Recoated

By J. F. SIEFEN
J. J. Siefen Co., Detroit

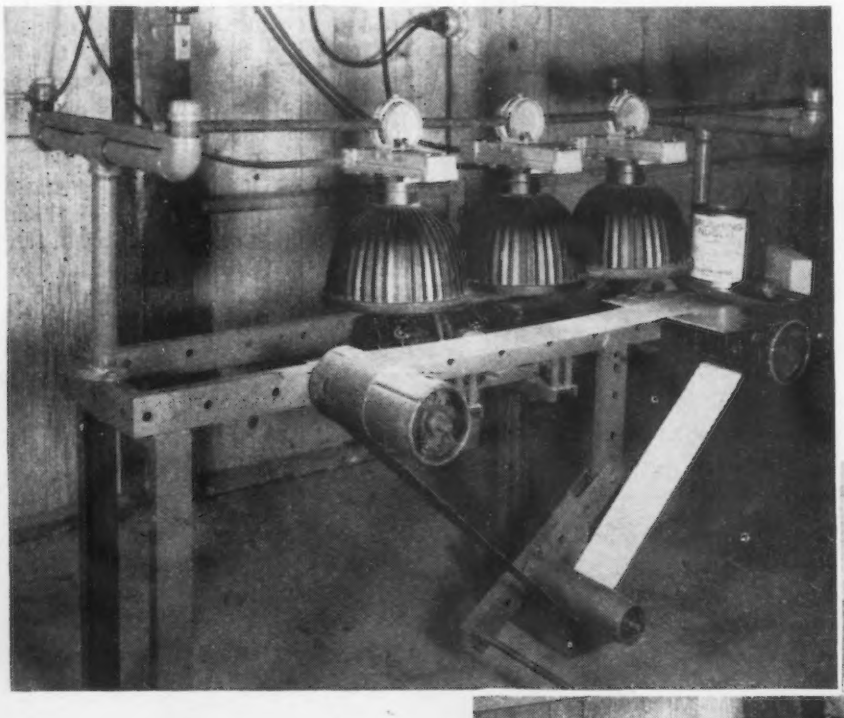
ABRASIVE belts when worn out may now be recoated by brushing on one coat of "Brushing Nuglu" made by the J. J. Siefen Co., Detroit 9. Brushing Nuglu is a mixture of a liquid cold glue and aluminum oxide grain which can be quickly applied and will restore the value of a worn abrasive belt.

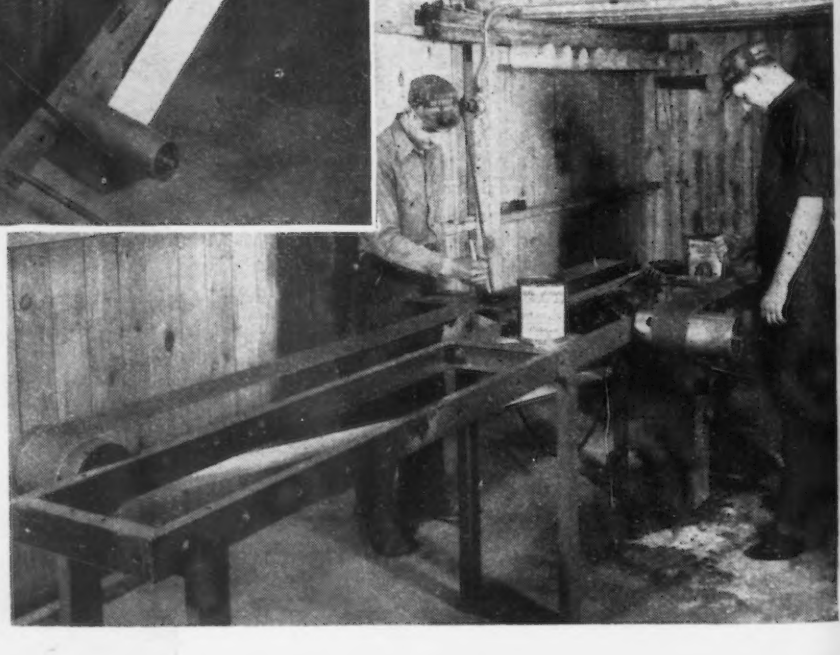
Since cloth, glue, grain and labor are all critical, this method of recoating belts represents a considerable saving over the cost of new belts. It is claimed that greater production can be obtained with recoated belts because Brushing Nuglu cuts better than the hide glue which is used to make new belts. This recoating material also adheres longer because it surrounds the grain and keeps it from flying off. Three to seven times more work for each recoating has been reported.

A machine used for recoating is shown in Fig. 1. This machine can be used for belts ranging in sizes up to 12 in. wide and 45 ft. long. It can be purchased from the Siefen Co., or can be made in almost any machine shop. The driving pulley is at the far end of the machine. The other pulley at the left is adjustable in 8-in. steps for length, while an idler pulley, best seen at the bottom of the machine in Fig. 2, is adjustable in any number of inches. This idler pulley is also used to obtain the proper tension on the belt as well as an easy means of placing the belt on the machine and removing it when recoating has been completed. All that is necessary is to lift the arm which carries the idler pulley and slide the belt off. Placing a belt on the machine is done in a few seconds.

Other articles by the author: "Polishing with Liquid Cold Glue", THE IRON AGE, May 1, 1941; "Polishing with Glue-Abrasive", March 18, 1943.

Fig. 1 shows how the Brushing Nuglu is applied while the belt is running at approximately 4 ft. per min. One revolution of the belt is necessary for applying the glue and another revolution for smoothing out.





ABOVE

FIG. 2—Infra-red lamps are used to dry the belts quickly. As one belt dries on one side of the machine another belt is placed on the opposite side.

RIGHT

FIG. 1—A double recoating machine which can be adjusted for belts of different lengths. The machine is motor driven but can also be operated by turning the driving pulley by hand.

The capacity of this machine is approximately 10 belts 8 ft. long by 6 in. wide per manhour. The drying time is approximately 12 hr. at room temperature. However, by using infra-red lamps shown in Fig. 2, drying can be completed in 15 min. and a double machine can be operated by one man. With this method the glue is applied to a belt on one side of the machine and the lights are slid over to a position above the belt while the operator sets up a belt on the other side of the machine. After the glue is applied, the lights are slid over to that side of the machine and the dried belt is removed and another belt placed on the pulleys.

Since a lot depends upon the way the glue is applied, some of the techniques in use are presented. It is important that belts are clean before being set up. They can be easily cleaned before they are removed from the polishing machine, but if this is not possible they can be cleaned with pumice or brick on the belt resetting machine. When applying Brushing Nuglu the common practice is to use the same size grain for recoating as was used for the original belt. In some instances, however, a finer or coarser size can be used. For fine grains a final diagonal brushing for the smoothing operation is best. It is also possible to spray the belts in size 120 grit and finer and obtain a very smooth recoat.

Belts of coarse grain sizes like 36, 30, 24 and coarser should not be set up with Brushing Nuglu. Instead the regular Nuglu should be sprayed or brushed on and aluminum oxide grain spread on through a hopper. A size coat should then be sprayed on and the belt dried. All three operations can be performed without removing the belt from the machine. Long belts of 20 to 50 ft. can be handled better without distorting the grain if only partially dried with the lamps and the drying completed over night. Belts may curl while drying but this is never detrimental and if the belt is flexed before placing on the polishing machine it will straighten out immediately.

Cellophane Bags for Aircraft Rivets

PACKAGING machines are now being used in the Consolidated Vultee Aircraft plant, San Diego, to automatically weigh a desired number of rivets (usually 1 or 2 oz.) and then the operator of the machine trips a lever which drops them into a cellophane envelope shown in Fig. 1. Adjacent to each packaging machine is another operator with a sealing machine shown in Fig. 2. To seal the envelope heat is applied through two jaws which clamp down on the folded envelope, and during this process rivets are kept out of refrigeration not longer than 8 to 10 min. Tricycle refrigerator units are used to deliver the packaged rivets from the sealing machine to the department refrigerator stations. These stations are conveniently located so that a riveter has to walk an average of only 40 ft. to obtain a supply of cold rivets.

A Vultee employee originated the idea of packaging rivets several

(CONTINUED ON PAGE 145)

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LEFT

FIG. 1 — The desired number of rivets are automatically dropped in cellophane bags which identify them as to size and type.

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RIGHT

FIG. 2 — This machine clamps down the folded envelope and by applying heat the cellophane bag is sealed.

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Tool Engineers Meet

o o o

IN two crowded days in Philadelphia on March 27 and 28, members of the American Society of Tool Engineers heard papers delivered on a wide variety of subjects from the latest applications of the honing technique for finishing aircraft and ordnance parts to human relations at the fabulous Jack & Heintz company in Cleveland. The program was arranged under the chairmanship of Douglas D. Burnside who was sworn in as the new president of the society at the annual banquet. Dinner attendance at 1250 was largest in A.S.T.E. history and all the technical sessions were packed. The usual tool exhibit held in conjunction with annual meetings was dispensed with this year due to war time conditions. Plan visitations were re-established, however, and proved a popular feature.

"How" Men Defined

Pointing out that the title "tool engineer" connotes a metal cutting expert and hence defines too narrowly the broad field of the A.S.T.E. membership, John H. Van Deventer, president and editor, THE IRON AGE, suggested at the annual banquet that his audience be called "How" men. Functionally tool engineers are the people who tell when and what to cut or to weld or to stamp or to cast, rather than have somebody else tell them where and what to cut, Mr. Van Deventer asserted.

"Your organization may have begun with a recognition of the importance of tool design as applied to metal cutting operations but it has already gone far beyond that," Mr. Van Deventer said. "It has developed into an organization representing the science of production, which includes production engineering. To limit yourselves to the field of metal-cutting would be to seriously limit the scope and sphere of your postwar activities. You cannot confine the big word 'how' in a little pigeon hole.

"Processes of production, of which you should be and will be the postwar planners, are dynamic and not static. They have changed materially in the past few years under the pressure of war and they will change still more under the requirements of peace in the years to come.

"The art of cutting metals will still be with us for generations to come, but you 'how' engineers must expand beyond the machining industry. As diagnosticians of production, you will be called upon to choose the best methods applicable to the desired results, whether these pertain to machining, powder metallurgy, forging, stamping or casting.

"Nor are you tool engineers or 'how' men dependent for your future on the rise and fall of any particular material. No matter whether the product calls for steel or iron or brass or aluminum or plastics, the how and the tools will be needed before these products can be successfully made. The war has vastly multiplied the number and kinds of materials that will be at our disposal for making postwar products. And with that multiplication comes a proportionately expanded horizon for you 'how' men. You are merely on the threshold of your opportunity."

The speaker also emphasized the importance of conserving materials and natural resources. Heretofore, in our industrial world, saving time has been the keynote, but Mr. Van Deventer asked his audience to consider the fact that time is inexhaustible, whereas resources are not.

"Material savings that we make today and thus pass along may be more highly appreciated by our grandchildren than our time savings. In the years to come, you gentlemen who possess the 'know how' must show the world not only how to save minutes but how to save materials. We will have to make what we have go further and do more," he concluded.

> "If I were to suggest a slogan for your Society which is perhaps the most rapidly growing of all technical associations, I would inscribe upon your banner the three letter word "How." It will undoubtedly be the most important word in our post-war technological and economic lexicon.
>
> "*How* to win this war by developing an overwhelming technological supremacy. *How* to win the peace by doing so much better than we have ever done that we can recover the losses we have suffered by pouring our resources upon the flaming world bonfire and in addition, at least materially, making the world a better place in which to live." . . . John H. Van Deventer in his banquet address before the American Society of Tool Engineers.

New Officers Installed

Douglas D. Burnside, superintendent, Quick Meal Stove Co., Div. of American Stove Co., St. Louis, was installed at the banquet as new president of the society, succeeding Ray H. Morris, vice-president, Hardinge Brothers, Inc. C. V. Briner, manager, small tool and gage division, Pipe Machinery Co., Cleveland, was moved up from second to first vice-president, and A. M. Sargent, president, Pioneer Engineering & Mfg. Co., Detroit, was elected second vice-president. To the newly created third vice-presidency, the directors named W. B. Peirce, works manager, Flannery Bolt Co., Bridgeville, Pa. L. G. Singer, Williams & Wilson Co., Toronto, was elected to the new post of assistant secretary and treasurer of the A.S.T.E. to give representation on the executive committee to the more than 1000 members in the four Canadian chapters. Mr. Peirce has served as national membership chairman for the past two years and under his leadership has brought up the roster to 15,750 members in 64 chapters.

Floyd W. Eaton, personnel manager, Crawford Door Co., Detroit, and Earl V. Johnson, carbide tool engineer, Firth-Sterling Steel Co., McKeesport, Pa., were re-elected treasurer and secretary, respectively. Adrian L. Potter remains as executive secretary.

Tooling Up a Gun Sight

At the first technical session, engineering, planning, tooling, production and inspection of the Sperry Series

At Philadelphia . . .

. . . Twelfth annual meeting of the American Society of Tool Engineers draws large attendance to hear talks on latest production methods.

o o o

K 50 cal. automatic computing sight was described by six executives of the National Cash Register Co., Dayton, led by John W. Humphrey, factory manager. These men analyzed the various problems connected with putting these instruments into production and showed how they were able to produce in 44,000 sq. ft. of floor space an output for which it was originally planned to use 300,000 sq. ft. Design of the computor itself was described by Gunnar Nelson, engineer in charge of war products. These sights go with the upper and lower ball turret guns on the B-17 and B-24 bombers. This intricate mechanism takes into account the range of the target, the lateral and vertical ballistic angles due to the speed of the plane and the effect of gravity on the trajectory and also the lateral and vertical prediction angles which allow for the speed of the approaching enemy plane.

The contract for this job was signed November, 1941, and by July, 1942, the first instrument had been shipped. Since then, over 15,000 computors have been delivered to the armed forces.

Preparing for this job meant laying out an entirely new section, motorizing a great deal of belt driven machinery and installing overhead monorail and roller type conveyors so as to facilitate flow of parts on a line production basis. In describing the layout, Walter G. Boswell, supervisor of planning and factory layout, indicated that in the assembly department, finished parts and subassemblies were hung from a constantly moving storage conveyor. Parts leaving the subassembly lines are stored in dust-proof containers before being sent to final assembly and the finished products are packed in dustproof containers.

In order to attain the desired production in the floor space allotted, many special machines were built and old machines converted for the purpose. As an example, Frederick A. Schultz, supervisor of tooling and foundry, illustrated a special hexagon turret head drill which is used to produce 96 holes in a very intricate aluminum casting. The unit saves a tremendous amount of space over even multiple-head units.

Special Tools Made

Because of the high precision required and the intricacies of the parts, many special cutting tools had to be made. Hole spacing on some of the frames has a tolerance of 0.001 in. and many of the holes themselves are held to 0.006 in. on the diameter. These holes are sized with tungsten carbide tipped reamers, of which 650, ranging in size from ⅛ to 1⅛ in., were made in the NCR tool room. This same shop built 172 circular form tools and 180 milling and profile cutters, all tipped with carbide.

One of the tricky jobs on this gun sight is the manufacture of several three-dimensional cams, which are used in the range finder mechanism. These cams must check within 0.0005 in. at 240 data spots. They are roughed out in special duplicating lathes and are finished on special grinders in which a contracting master cam is used to compensate for wheel wear.

DOUGLAS D. BURNSIDE
New President of the A.S.T.E.

Selective assembly was found to be the only feasible way of getting the desired close fits of the precision ball bearings, of which 110 are used in the instrument. The bearings themselves are checked by air and electric gages for i.d. and o.d. and by a system of coded color markings made both on the frame bores and on the shafting, the bearings are selected to give the proper fits. This procedure has eliminated much hand fitting on the assembly line. In the assembly itself, the operations have been broken down into simple units so that it has been possible to train women for this work. Fortunately, National Cash Register had available a group of supervisors who had had considerable experience in assembling intricate mechanisms, such as accounting and registering machines. Once the routine was established on the gun sight assembly, every step was thoroughly described in written form so as to simplify the training of operators.

Work in the inspection department was described by Edward W. Herman. He indicated that in many instances, mechanical means for evaluating quality had been devised so as to eliminate the human element as far as possible. For the purpose of checking intricate castings with large numbers of holes which have to be accurately located with respect to each other (because they govern to a great extent the running clearances between mating gears) a number of receiver type gages have been developed in which plugs locate the hole and indicators check the relation between surfaces. In other instances, visual inspection under a microscope has been combined with concentricity tests using dial indicators.

Success in achieving record breaking production records at Jack & Heintz, Inc., Bedford, Ohio, was at-

C. V. BRINER
1st Vice-President of A.S.T.E.

A. M. SARGENT
2nd Vice-President of A.S.T.E.

W. B. PEIRCE
3rd Vice-President of A.S.T.E.

tributed by William S. Jack to the humanism that prevails between management and employees. A man who had "served his time" in the shop and had been a business agent of a machinists union some years ago, Mr. Jack felt he knows worker psychology and attitude. He said he was trying to make every worker feel he was a partner in the business. On this score, his two principal objectives are to eliminate fear and to take care of the human body.

Stating that he has no quarrel with efficiency and time study men, Mr. Jack expressed the belief that the greatest curse to production is the fear that prevails in many plants that a piece rate price will be cut. As a result there is developed a bond of understanding between workers as to what they can reasonably produce without being cut. In the Jack & Heintz plants, on the other hand, straight time is paid and formal incentives are lacking, but everything is done to maintain high *esprit de corps*. Ever since the company was organized with 36 employees in November, 1940, a bonus of $50 a month has been given each employee. They now number 7600. Other features of the system incorporate company paid life insurance and a company operated vacation resort in Florida.

By their own choice, Jack & Heintz "associates" work 12 hr. a day, seven days a week. With "time and a half" over 8 hr. and double time for Sunday, the workers draw high weekly pay. To keep these workers in good health on an 82-hr. week, the company provides rest rooms with sun ray lamps and professional masseurs. Particular attention is paid to the care of feet and teeth, which the average factory worker neglects. A hospitalization plan is also provided. Excluding sick leave and other "authorized" absences, the company has gone one whole year without any absenteeism, Mr. Jack said. Tardiness is kept down by "razzing" of fellow workers. One hot meal is served free during each shift and at 3 p.m. and 3 a.m. coffee and hamburgers are distributed through the shop. Music is played over the loudspeakers to keep workers happy on routine jobs. Every effort is made to make workers feel that his or her effort is vital to the success or failure of the war.

Renegotiation Criticized

Mr. Jack then launched into a defense of his company's position on renegotiation. He maintained that what the Price Renegotiation Board is asking of his company is a return of the entire $7 million profit made in 1942 on a $23 million volume of business, despite the fact that progressive reductions in selling prices had been made every six month. In 1943, aggregate reductions in original contract prices amounted to $55 million, on top of which sales were $103 million. What the company is seeking is retention of 5 per cent profits after taxes, but is asking no preferential treatment and is willing to accept any uniform policy with respect to profits made by war industries. Some companies have been allowed to retain 14 per cent profit, Mr. Jack said.

Jack & Heintz has announced its intention to maintain a 40 hr. week in the postwar period and to provide jobs for returning veterans. It must, however, have profits and reserves set aside for them to keep this pledge.

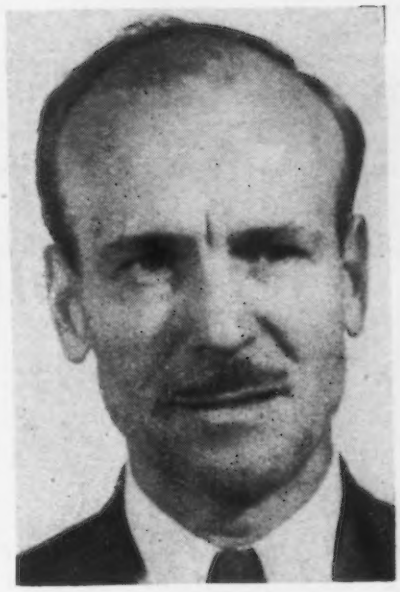
Mr. Jack said his files are bulging with peacetime projects but that additional capital is needed to finance reconversion. This he hopes to get from sale of common stock certificates to his associates, once SEC provisions have been met. Otherwise, he concluded, his workers must become wards of the government.

Honing Processes

In a session devoted to metal finishing, A. F. Hasty, district manager, Sunnen Products Co., St. Louis, described the basic principles of honing, particularly on machines where the work is reciprocated by hand on the honing arbor. Abrasive stick tools of this type will correct taper and out of round and can produce holes accurate to 0.000025 in. and 1 to 3 microin. surface finish. Holes as small as 0.185 in. x 3 in. long have been finished by a tool carrying one abrasive stick.

Discussing the question of bond hardness and grit size, Mr. Hasty indicated that the selection of bond hardness depends largely upon the relation of stone area to bearing area; the more relative stone area, the softer the bond required to tear the dull grits from the bond. For the same reason, harder bonds can be used

FLOYD W. EATON
Re-elected Treasurer



EARL V. JOHNSON
Re-elected Secretary

for roughing work but softer bonds are needed to keep the stones sharp when fine abrasives are used on finishing work. Much depends upon the prior preparation of the work, that is, whether it is drilled, reamed or ground. It is obvious that a fine grit stone should not be used on a rough drilled hole. The relative hardness of the material being cut is also a factor in selection of grit size. With the softer materials, the abrasive tends to imbed in the work and grain size should be kept small.

Kirke W. Connor, president, Micromatic Hone Corp., Detroit, illustrated a large number of applications of the honing principle in finishing war products. In aircraft engine work, honing equipment is being used to develop a functional finish in cylinder barrels, valve tappet guides, articulated and master connecting rods and on many accessory parts. External honing is being applied to finish the o.d. of piston rings mounted in multiple on an arbor that is reciprocated with respect to the tool.

A number of parts like wrist pins and in-line crankshafts are honed internally to remove tool scratches that might result in early fatigue failure. Other applications in aircraft include swash plate hydraulic pump bodies and hydraulic valves used on plane controls, automatic pilot parts, oleo struts and hydraulic brakes. Races for ultra precision ball bearings are now being finished by honing to the point where no scratches can be observed under a 60-power microscope. A spherical hone has been developed for finishing the raceway of a spherical type ball bearing ring.

Rifling a Hardened Barrel

Among some of the unusual applications of honing of ordnance parts is the broaching of rifling grooves on barrels that have a slight amount of choke at the muzzle end and ones that have accelerated rifling in the bore. Mr. Connor indicated that the gun barrels for the 75-mm. cannon mounted on the B-25 Mitchell bombers have thin wall thickness for lightness and are heat treated for extremely high physical values. The material is so hard that the rifling grooves are honed from the solid, using diamond metallic bonded abrasives. He also illustrated a machine for refinishing big guns on battleships without removing them from the gun turrets and showed a photograph of a honing tool capable of finishing a cylinder 41 in. in diameter x 40 ft. long, used as the hydraulic power unit for a plane catapult on a battleship.

Electronic Controls

In a session devoted to variable machining controls, G. A. Caldwell, manager, general mill and resale section, industry engineering department of Westinghouse, described and demonstrated the Westinghouse Mot-O-Trol drive for machine tools and other industrial machinery. In this drive the speed of a shunt wound d.c. motor is controlled over a range of 10:1 up to 100:1 through electronic circuits. Vacuum tube rectifiers allow the unit to be operated off an a.c. line. Up to the base speed of the motor, infinite variations in speed are obtained by control of armature voltage and beyond that range by field weakening. In the former range the motor operates at constant torque and at the latter at constant horsepower.

While this general scheme of control is not new, Mr. Caldwell described how improvements in control had been made to make the drive practically foolproof. The motor will not run away if the field is "killed" and a current limiting control can be set to give a definite maximum torque during acceleration. The speaker called particular attention to the good speed regulation obtained between no load and maximum load at any speed setting, which is governed by small potentiometers. Dynamic braking speeds up reversal which may be at a different pre-selected feed than forward.

At the same session, R. A. Cole, experimental engineer, Norton Co., described the application of the electronic control to a cylindrical grinder. Principal advantage cited was the wide speed range available and the use of a low speed drive, which minimizes gearing and tends to reduce vibration. Four special applications of electronically controlled adjustable speed motors were later described in detail by B. T. Anderson, electrical engineer, Sundstrand Machine Tool Co. Typical of these is a lathe setup for cutting a spiral groove in a disk. As the tool is fed in, a small rack and pinion on the cross slide rotates the shaft of the control potentiometer and automatically steps up the spindle speed to maintain constant peripheral cutting speed.

Fly Cutter Milling

Since most present day milling machines are lacking in power to take advantage of the latest concepts in high speed milling with cemented carbide cutters, the best compromise is to use fly cutters of one or two teeth, it was suggested by Ralph R. Weddell, president, Weddell Tools, Inc. The latest machine designed for hyper milling, for example, has a 50 hp. motor whereas the average miller *in use* is driven by a 3 hp. motor. He advocated maintaining a good chip load per tooth for best performance. With the power available, this often means that only one or two blades are needed with a given feed rate.

For figuring chip load and number of teeth, starting with the available

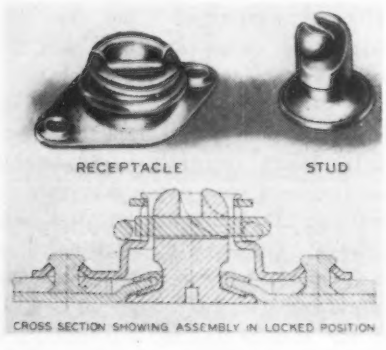
(CONCLUDED ON PAGE 146)

New Equipment . . .

Small Tools

. . . Description of small tools and accessories useful around a shop is continued in the following pages from last week's issue.

THE ELASTIC STOP NUT CORP. OF AMERICA, Union, N. J., has acquired world rights to a spring-lock fastener for holding the engine cowlings of high-speed war planes, originally offered by the Aircraft



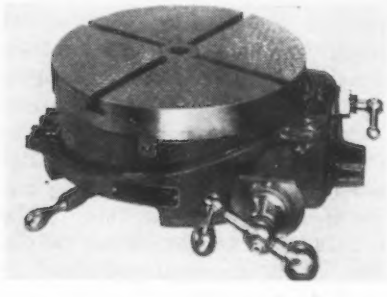
Parts Development Corp. It is a light weight unit of rugged construction, and is suited to access plates on farm machinery, panels on motor trucks, home heating units, radio equipment and at any point where a quick-acting vibration-proof, non-rattling fastening is needed.

Rivet Driver

A PNEUMATICALLY operated rivet driver that will drive four blind rivets a minute in aircraft production has been introduced by the *Independent Pneumatic Tool Co.*, 600 West Jackson Boulevard, Chicago 7. The Thor Riv-Driver will drive and buck in one operation. The tool operates in a 4-step cycle and features a light at the top of the handle which flashes "OK" to indicate when the rivet has been accurately upset on the blind side. The first step in the cycle screws a mandrel into the rivet; the second step pulls back the mandrel, upsetting the rivet and flashing on the "OK" light; the third step unscrews the mandrel and the fourth shuts off the tool.

Rotary Table

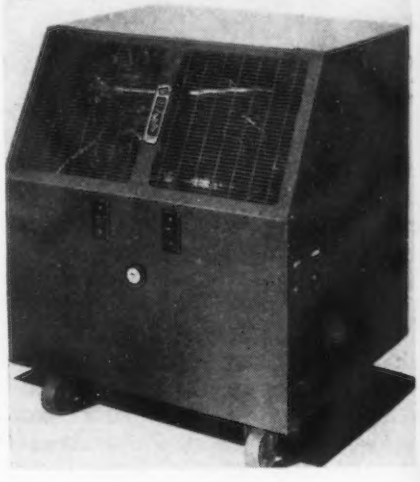
A 12-IN. tool room rotary table, manufactured by Index Machine & Tool Co., is being distributed by *Blank & Buxton Machinery Co.*, 3100 East Michigan Avenue, Jackson,



Mich. It features ball type main bearing, quick acting worm throw out, single motion positive table lock which does not cramp table out of alinement, coolant trough cast in base, and hardeneed and ground worm.

Cutting Oil Cooler

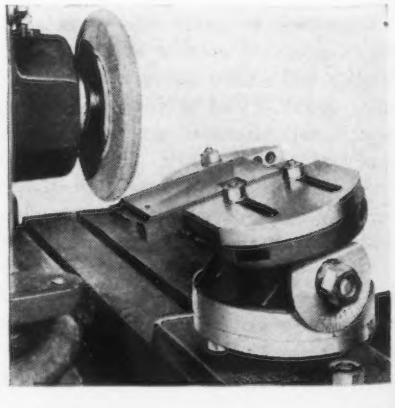
THE industrial fluid refrigerating system built by the *Gray-Mills Co.*, 219 West Ontario Street, Chicago, mechanically refrigerates fluids, settles and screens out chips and the coarser abrasives and applies the coolant or fluid to the work through the medium of a self-contained pump. The Model 400 is adaptable to the cooling and temperature maintenance of coolants for metal cutting, hydraulic oil applications, maintenance of submerged bearing temperatures,



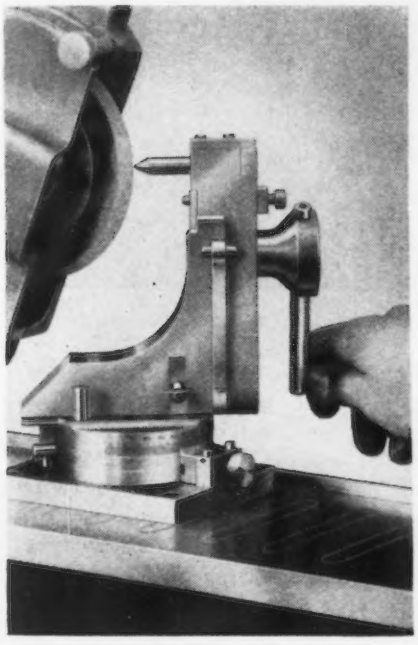
quenching oils, spot welders and laboratory setups. The unit is compact and portable.

Chaser Grinding Fixture

A UNIVERSAL chaser grinding fixture has been put on the market by the *Oster Mfg. Co.*, 2057 East 61st Street, Cleveland 3. It is designed for table mount-



ing and is adjustable for any throat or rake angle. It will hold all sizes, makes and types of dies and thread chasers.

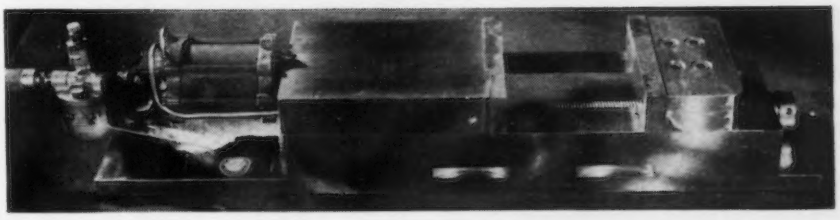


Wheel Radius Dresser

THE model E radii and angle dresser has been brought out by *J. & S. Tool Co.*, 477 Main Street, East Orange, N. J. An important feature is "Fluid-motion" dressing. With one setting and using one handle, angles tangent to radius are perfectly blended in one continuous fluid motion that leaves the form clean, precise and free of the chatter-marks caused by tension and machine vibration when interruptions occur. The dresser has a 14-in. wheel capacity and a radii range from 0 to 3 in. concave and to 3 in. convex.

Plastic Gage Handle

UNDER the trade name Plast-O-Lock, a collet-type plastic gage is announed by the *Turner Gage Grinding Co.*, Ferndale, Mich. It is slotted and tapered to fit into the tapered end of a standard gage holder. Hand pressure is sufficient to lock the gage in the holder. Plug size ranges from 0.050 to 0.690 in. but the size range can be extended down to 0.029 in. The lengths of plugs are unusually long and the ends may be cut off when worn and a new section extended through the collets.



Pneumatic Vise

A PNEUMATIC vise has been brought out by the *Bellows Co.*, 861 East Tallmadge Avenue, Akron, which eliminates all hand clamping. Automatic opening and closing of the vise jaws is synchronized with the milling machine bed. Clamping pressure may be controlled from 1 to 40,000 lb., either by controlling the length of the stroke actuating the moving jaw through adjustment of the jaw opening or by control of air pressure. This model CVH-60 fits any standard milling machine without drilling holes.

Soluble Cutting Compound

A LOW viscosity coolant lubricant water solution has been announced by the *Filmite Oil Corp.*, Station K, Milwaukee. Hydromite is sold in concentrated form, the user adding water to get the proper solution for the individual cutting tool lubricating job. The cutting lubricant is transparent and practically colorless and is said to possess extreme oilness, high film strength and anti-welding properties. It is claimed that it dissipates heat rapidly and that its low viscosity allows it to get to the point of work quickly.

Diamond Bonded Wheels

A SECRET bonding process is said to give "Super-Cut" diamond bonded wheels an unusually long life, according to *Industrial Abrasives, Inc.*, 3724 West 38th Street, Chicago 32. The process sets each individual diamond solidly and uniformly in a special metal. They are made in cup, dish, plain and small peripheral bonded wheels in a wide assortment of sizes.

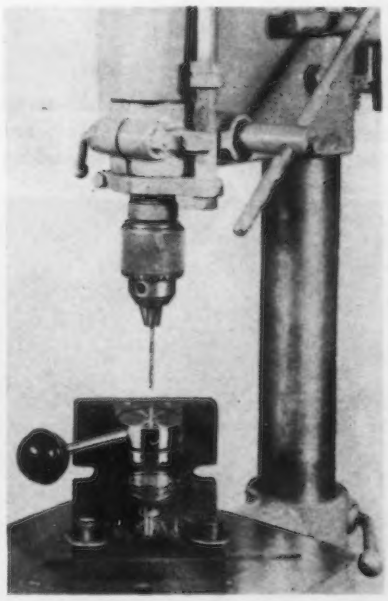
Speed Collet Chuck

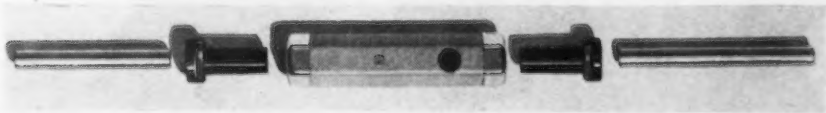
THE collet speed chucks developed by *Zagar Tool, Inc.*, 23880 Lakeland Boulevard, Cleveland

17, can be mounted on any lathe grinder or rotating spindle. They can be opened and closed while machine is running. There is no endwise movement of the collet when the work is gripped so that facing operations can be held within close limits. Being independent of spindle, the chuck can be mounted on faceplate and indicated to run dead true regardless of any spindle run-out. It is available in 1 and 2 in. sizes.

Collet Chuck

THE MICRO-MASTER PRODUCTS CO., 817 West North Avenue, Chicago, has designed and engineered the Micro-Chuck to eliminate constant building and improvisation of jigs and fixtures. It handles all

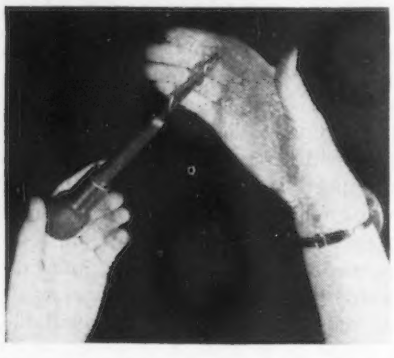




No. 00 size collets and takes all standard removable drill bushings from 0.055 to 5/32 in. drill sizes. A ground angle base permits clamping in either horizontal or vertical positions. It can be clamped to a drill press table, the faceplate of a lathe or milling machine dividing head for collet or indexing work. It can also be clamped to the faceplate of external and internal grinders.

Burring Tool

A BURRING tool designed to save time and reduce fatigue has been developed by *Murray Corp. of America*, 7700 Russell Street, Detroit. Used on aluminum aircraft parts, the tool is merely gripped by the handle, its end inserted in the hole to be burred and pressed down. The helical track turns the burr sufficiently to



clean the hole in one down-and-up cycle. An internal spring in the body of the tool provides sufficient pressure against the small countersink to return the handle to operating position. It can be utilized on all diameters from 3/32 to 3/16 in. Murray has licensed the *Vesco Co.*, 1600 East Eight Mile Road, Detroit, to manufacture and sell this device.

Circular Type Holder

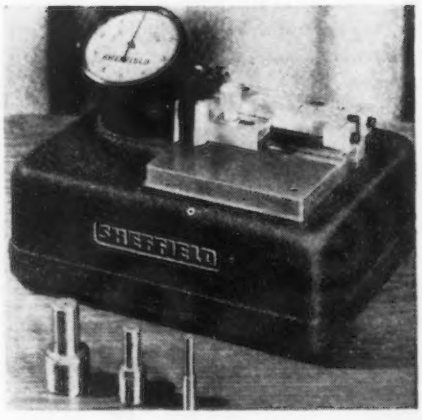
TYPE holders of special design for marking flat, circular pieces on a variety of radii are offered by *Wm. A. Force & Co., Inc.*, 216 Nichols Avenue, Brooklyn 8, N. Y. Fitted with individual spacer rings and retainers, the holder may be used for marking pieces of different curvature. Changes from one curvature to another are made by removing the retainer plate and pulling out the inside recess rings. All parts are interchangeable in the one holder. Type of single flange design is usable with the other parts for marking on any of the various radii.

Comparator Charts

UNIVERSAL screw thread comparator charts are available from *Engineers Specialties Division, Universal Engraving & Colorplate Co.*, 588 Monroe Street, Buffalo, for the entire series of both American National fine and coarse threads. Elimination of duplicate charts has made possible the checking of from one to seven screw-thread sizes on individual charts, and the entire range of 57 screw-thread sizes, covering both the fine and coarse thread series, has been consolidated into 26 American National screw-thread comparator charts. Special holders have also been devised to clamp these transparencies on optical comparator screens.

Lead Checking Gages

DESIGNED for rapid and accurate checking quantities of threaded parts such as aircraft components, studs and small shafts, the Leadchek is being marketed by the *Sheffield Corp.*, Dayton 1. Thread lead can be rapidly checked to an accuracy of 0.0001 in. Threaded length up to 2 in. may be handled and threads as fine as 40 pitch or as coarse as 2¼ threads per in. It will check parts having diameters ranging from

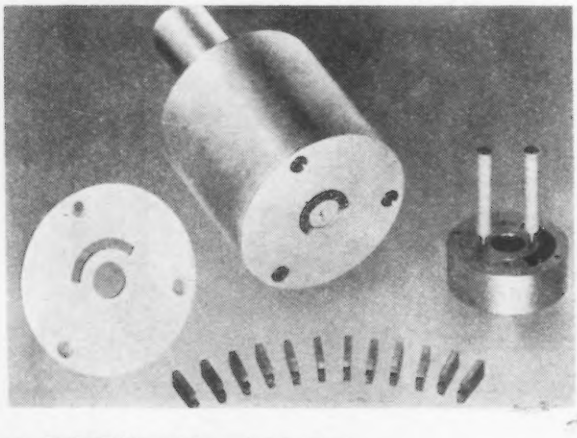


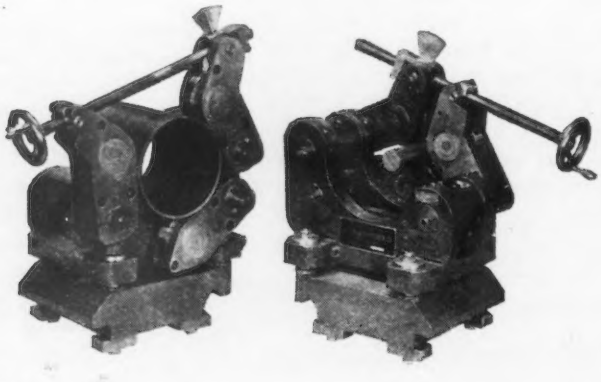
0.125 to 2 in. The gage may be obtained with a dial indicator, Electrichek or Electrigage head.

The company has also developed an adjustable snap gage in twelve models, for checking work as it is being brought down to size without removing work from the machine. It can also be used for inspecting a finished part at the bench and for classifying parts of such size or weight as cannot be checked with other types of comparators.

Steady Rest

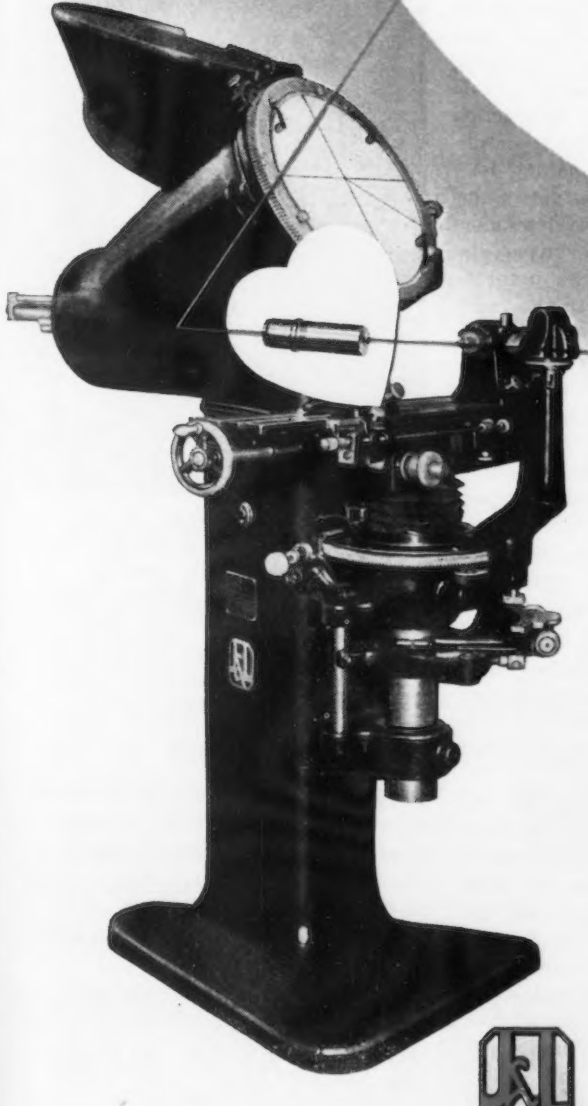
A HEAVY-DUTY, self-centering steady rest, especially developed for second operation work on parts such as propeller shafts and other airplane parts requiring end machining operations on either engine or turret lathes is announced by the *Charles Stecher Co.*, 2452 North Greenview Avenue, Chicago 14. The hand operated model is intended for mounting directly on the ways of a 22 in. lathe and has capacity of from 1½ to 9 in. An air operated model is designed with bracket for mounting on the back of a heavy duty turret lathe to allow clearance in front for the side turret.





Rx FOR HEART TROUBLE

on optical inspection equipment



The lens system is the *heart* of every optical inspection machine. Without perfection in this system—without special lenses, precision cells and housings—without optically flat mirrors, heart trouble results. This means distortion, fuzzy edges, and prismatic colors on the shadow image—inspection that is *fatal* to production.

Your protection against heart trouble is the **Jones & Lamson Optical Comparators.** For the lens system of each machine is literally prescription-designed by Jones & Lamson inspection engineers and built to those specifications by their own craftsmen. This highly specialized lens system, so necessary for inspection by optical projection, is your guarantee of trouble-free performance. The shadow image on every **Jones & Lamson Comparator** is dark, clear and sharp. It is absolutely accurate over the *entire* chart glass. The light around the image is entirely free from prismatic coloring.

For accurate, rapid, economical inspection . . .
BEYOND A SHADOW OF A DOUBT!

•

Manufacturers of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies

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JONES & LAMSON
MACHINE COMPANY
OPTICAL COMPARATORS

Springfield, Vermont, U.S.A.

Assembly Line . . . STANLEY H. BRAMS

• Harry Ferguson expanding its line in the River Rouge Works. Objectives are to lighten weight and simplify design. Only two sizes of heads on bolts and nuts.

DETROIT — Harry Ferguson Inc., is expanding its line well beyond the tractors turned out in the River Rouge works of Ford Motor Co. A complete line of basic farm implements is now under the Ferguson banner; and specialized farm tools for use with tractors will be added later.

In this enlarged sphere of operations, the Ferguson firm is continuing a policy started when it established its relationship with Ford. Rather than building an integrated implement manufacturing plant of its own, its production is being carried on in co-operation with short line implement manufacturers. It is understood, although no confirmation has been forthcoming from the company, that about 20 implements have been incorporated into the line in this manner during recent months, and more will follow. Trade circles report that the details of the Ferguson plan of manufacturing co-operation insure supplier companies of a fair profit, plus an opportunity to participate in savings achieved in production methods.

In all cases, a distinctly Ferguson-type product is developed. Objectives are to lighten weight and simplify the design. Indicative of the extent to which the simplification ideal is carried, the Ferguson tractor itself has only two sizes of heads on nuts and bolts—one wrench alone is necessary for maintenance.

In engineering these implements, Ferguson also seeks the same objective of integrated operation which characterizes the tractor-and-plow combination forming the basis of the line. With an implement merely hooked onto the rear of the tractor and towed, the Ferguson machine would not be considered in trade circles to be greatly different from any other small tractor. But by being able to offer a line of implements which can be more or less integrated with the tractor, like the plow, the unified system probably does offer something distinctive for farm use.

Once arrangements have been made with a company to produce the Ferguson line, a fairly well-defined procedure is followed to integrate the manufacturing into the Ferguson philosophy. Individuals or groups of specialists go over the operations at the implement plant with several objectives in mind. A metallurgist studies the product itself, changing specifications where possible from cast iron to steel alloy. Production men go over the plant layout, simplifying the operation and making long range plans for volume output. Sales and advertising men develop merchandising programs. Ferguson distributors may meet at the plant to familiarize themselves with the facilities at hand and the product itself.

TO date, the Ferguson nameplate has been put on some of the implements in the line, those considered to measure up to standards set by the company. In other cases, marketing is continued with the old name. In some instances, where a well-established firm has contracted to produce for Ferguson, both the old name and the Ferguson name are used.

Distribution in all cases, however, is through Ferguson dealers, which now total more than 2000 throughout the country.

By means of this program the Ferguson people hope to reap definite advantages which will make them a highly important factor in the farm implement field. By means of the specialized plants and the limited number of designs which they are developing in each type of implement, they hope to achieve volume at low prices. Inasmuch as these plants are generally located close to their natural distributional areas, the system of small plants are expected to provide notable savings by reducing transportation costs. Finally, the Ferguson people feel they are building up the country's well-being and internal economy by employing a number of smaller, decentralized plants, many of which are a main source of employment for the towns in which they are located.

The producer group utilized by Ferguson in this program is of more than passing interest. For the most part the plants are small, dealing in one product rather than a line. This type of plant has had stormy going for the last 15 or 20 years, and its number has steadily reduced, due to

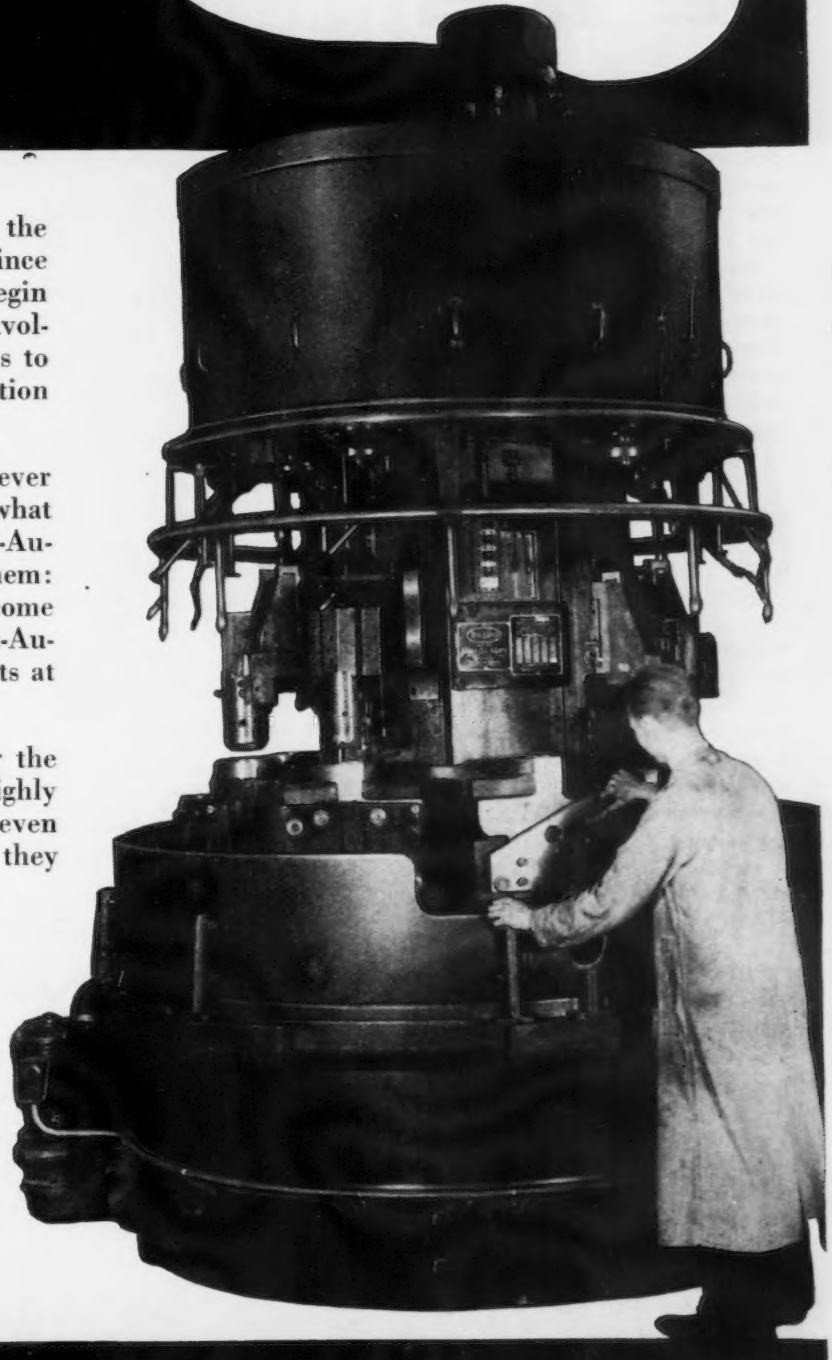
GM POSTWAR AIMS: *Charles E. Wilson, president of General Motors, estimated his company will employ* 400,000 *in postwar production and about* 200,000 *in distributing GM products. He made this statement before the House Special Committee on Postwar Economic Policy and Planning.*

You Want 'em Fast? YOU GET 'EM FASTER....

The many production records which the Bullard Mult-Au-Matics have broken since Pearl Harbor were *good* records to begin with. For the urgent need of greater volume has impelled many plant managers to call on Mult-Au-Matic to lower production times already considered phenomenal.

The result has been inevitable. An ever wider range of industries now know what the automobile makers—users of Mult-Au-Matics since 1915—could have told them: That single-spindle machines can not come close to doing a job as fast as a Mult-Au-Matic, where 8 stations work on 8 parts at once.

What these new users will learn *after* the war is that their Mult-Au-Matics are highly adaptable. That making fast times even faster will give them a big head start as they battle for peace-time markets.



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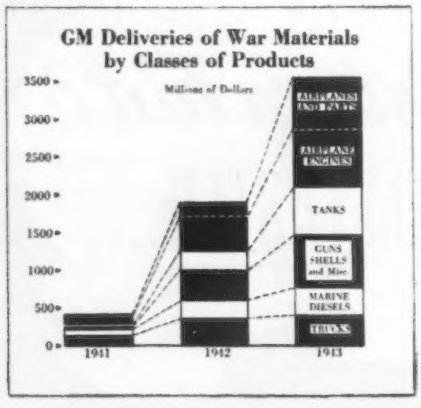
At times we have available on subcontract basis a portion of our production facilities for precision workmanship. Your inquiry will receive our prompt attention.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT



the competition of the broad line producers in the field. Conceivably something like the Ferguson program will salvage the fortunes of a number of these.

More efficient production is being anticipated by the Ferguson people as a practical outgrowth of their production philosophy. Studies some years ago indicated that $150 in capital investment is necessary in the implement field to produce $100 in annual sales. By means of decentralized operation, efficient management, and anticipated volume, Ferguson expects to improve this ratio considerably.

Quite obviously all the planning is on a long range basis. Limitations in production of farm implements, growing out of the war, necessarily curtail volume today. But Ferguson hopes to perfect its operation and manufacturing network during this war period by producing necessary, Washington-authorized tractors and implements; to speed this momentum as rapidly as possible; and to be ready for the civilian goods market as soon as the war ends.

THE company is quietly moving to strengthen its organization against this day of opportunity. Several noteworthy additions have been made to the headquarters staff at Dearborn since the first of this year.

Perhaps the most significant among these has been the appointment of Albert W. Lavers as industrial tractor engineer. Mr. Lavers was formerly chief engineer of the tractor division of Minneapolis-Moline Power Implement Co., where he was considered responsible for much of M-M's engineering design. Named as director of research was D. A. Milligan, who came from Cleveland Tractor Co., where he was active in various capacities in recent years, including equipment sales manager and agricultural engineer. Both these men are consultants to the WPB Farm Machinery Division.

As director of farm practices, Ferguson has appointed Harold E. Pinches, who came from the University of Connecticut, where he was director of the department of agricultural engineering.

The company recently appointed W. M. Alexander to head its legal department; Mr. Alexander's interest in agricultural matters was strong up to and including his 18-year tenure with the Chicago patent law firm of Parker-Carlson-Pitzner and Hubbard.

What makes the entire Ferguson plan program of particular interest at Dearborn is the fact that it bears the possibility of bringing to realization Henry Ford's philosophy of keeping one foot in industry and one foot in the soil. Not only is this true for the United States, but it also has the fundamental elements required for successful adoption to world-wide operation, particularly where it will be necessary to initiate or rebuild the agricultural and industrial economy. The Ferguson officials, it may be added, have an interested eye cocked in the direction of the post-war farm implement market abroad.

Rise in Heavy Truck Output Shown by WPB

• • • **Over** 37 per cent of the motor trucks produced in the United States in the year 1943 were in the heavy category, compared with 30 per cent in the year 1942 and only 17 per cent in 1940 and 1941, according to figures released by the Automotive Division of WPB. The proportion of both light and medium trucks has been declining.

The figures in the table cover actual production of trucks in the United States for military and civilian, excluding military half-trucks. For 1942 and 1943, light tracks for civilian use were defined as those up to 9000 lb. gross vehicle weight; medium, 9000 up to 16,000 lb. gross vehicle weight; and heavy trucks, 16,000 lb. and over gross vehicle weight. In previous years, civilian trucks were classified the same as military trucks based on carrying capacity, with light trucks defined as those up to 1½ tons, medium 1½ to 2½ tons, and heavies 2½ tons and over. The 1943 data are not directly comparable with previous years, but the correspondence is close.

Two Firms Will Finish Contract for Ship Engines

• • • **Joshua Hendy** Iron Works of Sunnyvale, Cailf., will complete 73 Liberty ship engines which were being built by the Iron Fireman Mfg. Co. of Portland, Ore., the Maritime Commission announced March 27. Iron Fireman's contract was cancelled when a fire put the plant out of operation after delivering 312 engines under a contract calling for a total of 389. Filer & Stowell Co. of Milwaukee, Wis., will build the other four engines.

Production of Motor Trucks and Truck Tractors

	Light	Medium	Heavy	Total
1940, Full Year	354,150	271,779	124,411	750,340
1941, Full Year	439,631	424,215	178,424	1,042,270
1942, Full Year	300,840	255,267	241,088	797,195
1943, Full Year	268,438	154,987	252,077	675,502
1943				
January	23,727	7,019	18,639	49,385
February	23,314	6,453	17,553	47,320
March	27,544	8,268	20,065	55,877
April	23,107	9,717	23,273	56,097
May	21,217	12,696	21,244	55,157
June	20,734	14,070	21,658	56,462
July	20,925	16,024	23,321	60,270
August	19,944	17,809	23,520	61,273
September	21,089	16,094	20,254	57,437
October	22,046	17,807	20,145	59,998
November	21,717	15,120	20,132	56,969
December	23,074	13,910	22,273	59,257

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by providing better, faster, more accurate threading

MURCHEY

Threading Tools

Type "B-M" Collapsible Machine Tap

Saves production time. Increases machine capacities. Insures instantaneous action. Gives greater accuracy of thread length.

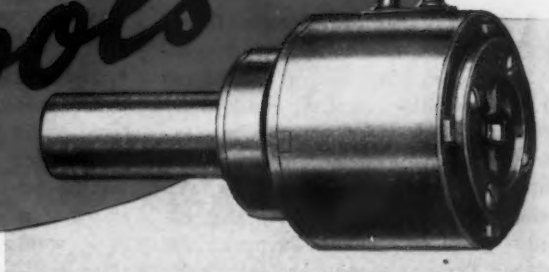
4 WEEKS' DELIVERY

● Murchey self-opening dies and collapsible taps are speeding up production schedules on threaded parts for tanks, guns, bombs and shells. And by giving this extraordinary short delivery they are getting these schedules started much more rapidly. The record of these tools is outstanding.

Write for literature on type "C-O", type "G" and on our New Collapsible Machine Tap Type "B-M". Also for folders on Murchey Milling Machines, Shell Tapping Machines and Roller Pipe Cutting-off Machines. You need this literature for ready reference.

Address Dept. I

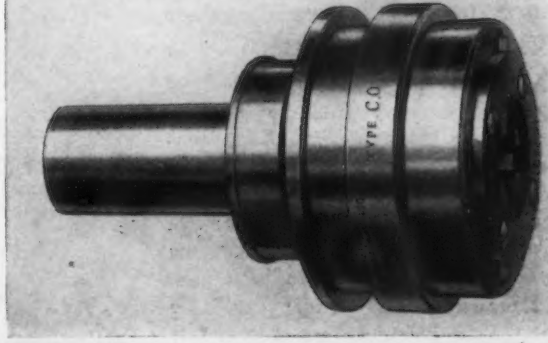
MURCHEY MACHINE & TOOL CO.
DETROIT 26, MICHIGAN



Type "G" (non-rotating) SELF-OPENING DIE HEAD—Designed and engineered for use on any machines where die heads do not rotate. Made in sizes from 7/16" up to and including 6".

●

Type "C-O" (rotating) SELF-OPENING DIE HEAD—a companion to type "G" for use on machines where the die head revolves. Takes the same chasers as well as many parts of type "G".



MURCHEY

Washington . . . L. W. MOFFETT

• Senator Truman's bid for vice-presidency casts shadow on most effective Congressional committee in Capitol . . . Portal-to-portal iron ore decision will be abused by unions in other industries.

WASHINGTON—Senator Harry S. Truman's apparent candidacy for vice-president as Mr. Roosevelt's running-mate may wreck the most effective Congressional Committee at the Capitol. After issuing its third annual report, the committee is marking time, and already partisan politics aroused by Senator Truman's endorsement of the fourth term threaten to skid the committee's unimpeachable reputation into oblivion.

Senator Ralph O. Brewster, Republican of Maine would be the committee's new chairman and it is assumed he would prove capable, but criticism of Senator Truman's trading on committee name for political purposes may make it impossible for committee Republicans and Democrats to continue to work together harmoniously, colleagues say.

ONE of the most nonsensical of all surplus property disposal ideas yet is the Department of Commerce's plan to palm off miscellaneous light Navy craft on business through the moldering Inland Waterways Corp. This postwar idea would be fine transportation, traffic men say, if river and lake traffic could be expected to boom during peace, but all indications are other carriage methods have for many years outcompeted water-borne traffic, and it is expected this trend will continue. Besides, most Navy craft in this category were not built for commercial use.

* * *

• **The late Supreme Court** decision in the portal-to-portal iron ore case is going to give rise to all sorts of sub terfuges by unions, it is predicted. A good example of this sort of thing is the 5c. awarded by Economic Stabilizer Vinson to the railroad workers for time away from home.

It is conceivable that the court might sustain commutation between work and home as a part of working time under the decision, if the Administration decided it was due, no matter what the plain intent of Congress was in passing the Fair Labor Standards Act.

It is also possible that the court might think working time is time spent going from the steel mill gates to the mill where a worker is employed, or working time some day may come to mean time spent in bed.

* * *

• **Judge Thurman Arnold** is against brain-teaming. If a group of scientists work in a research laboratory which produces an invention it will be presumed to be the collective effort of a group, and not patentable as it would be if it were the effort of an individual.

This tortured anti-business reasoning with no foundation in statute, regulation or previous decision was the crux of an opinion by ex-Trust Buster Arnold recently in the patent application case of Potts versus Coe before the Court of Appeals for the District of Columbia.

The decision is not only anti-business and anti-established-law, it is anti-progress. Must every company prove to the government in the future that it has incased its inventors in sound-proof, windowless cells and has held them incommunicado the whole time an invention is in process before it is granted a patent? It would seem so.

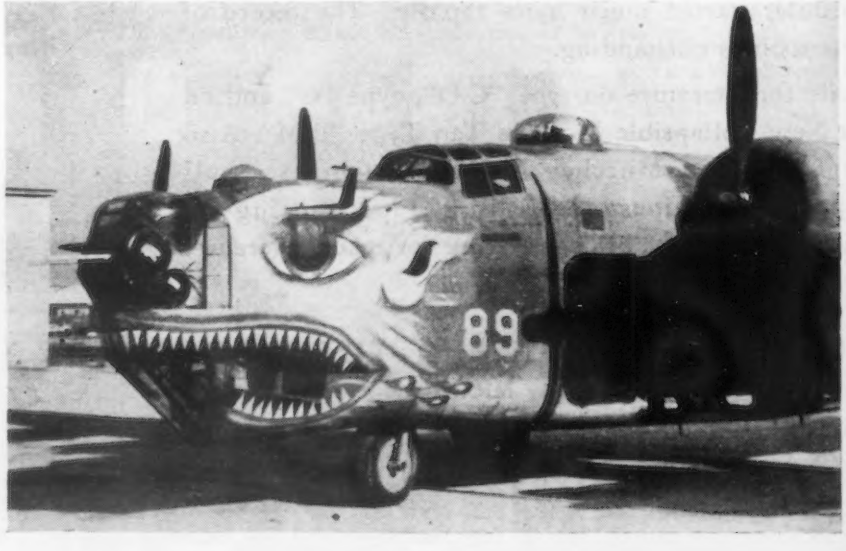
* * *

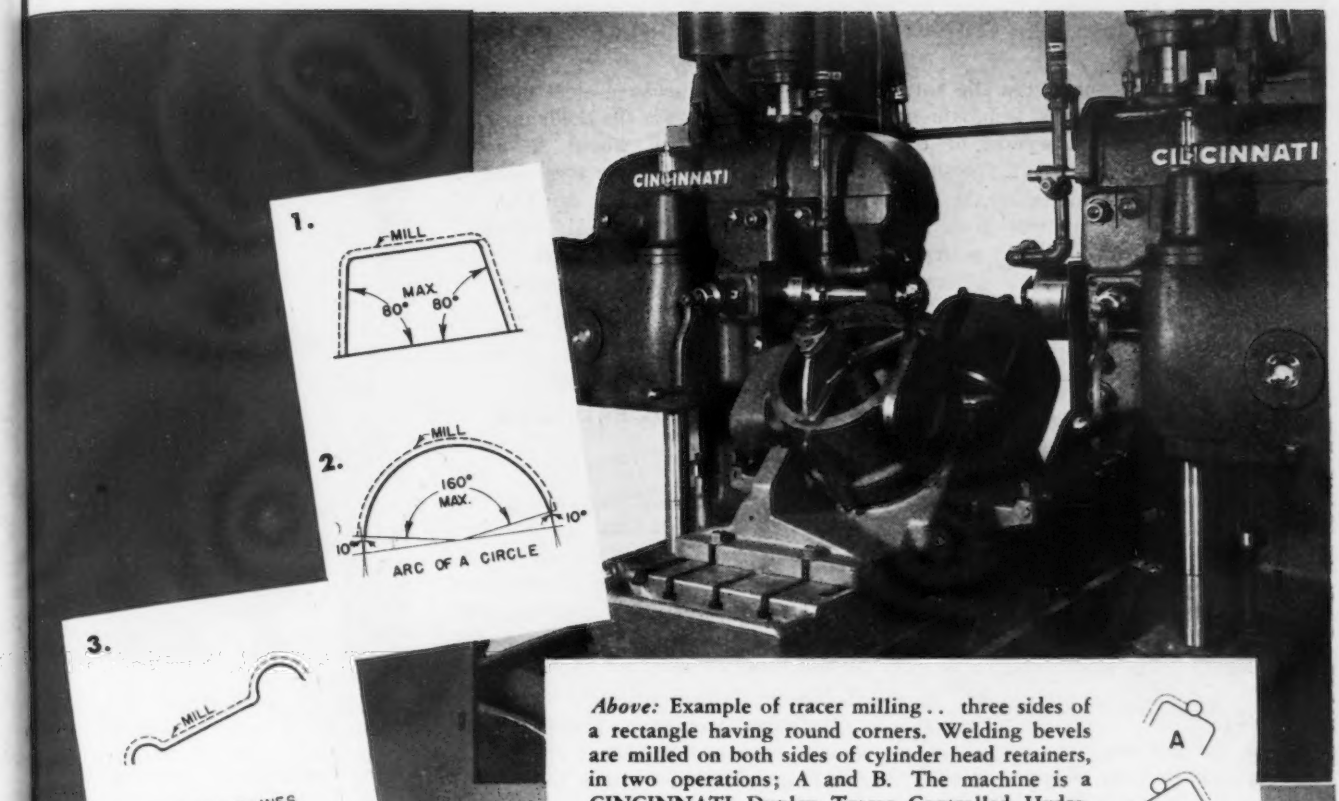
• **An interesting discovery** is the fact that England has a Barney Baruch. He is William S. Robinson, multi-millionaire industrialist of Australia. To him Sir Clive Bailieu, former British Combined Raw Materials Board head who now is deputy president of the Federated British Industries and Sir Oliver Lyttelton, Minister of Production, are "his boys" just as numbers of American officials are Barney's "boys."

* * *

• **It is reported** that Mr. Robinson is the mainspring of the cartel movement which is now reaching westward across the Atlantic. More American cartel news is in the making. Events shaping up which will make the O'Mahoney Bill for the registration of cartels on the legislative "must" list will soon become apparent.

JAP TERROR: *Taking a page from the book of the fighter pilots in the Japanese theater, the crew of this B-24 Liberator in India awed the Japs with this Tiger Shark design on this four-engined bomber.*





1.
MILL
MAX
80° 80°

2.
MILL
160°
MAX.
10°
10°
ARC OF A CIRCLE

3.
MILL
STRAIGHT LINES
AND CURVES

4.
MILL
1ST. OPERATION
MILL
2ND. OPERATION
BOX OUTLINE
(REQUIRES TWO OPERATIONS)

Above: Example of tracer milling . . three sides of a rectangle having round corners. Welding bevels are milled on both sides of cylinder head retainers, in two operations; A and B. The machine is a CINCINNATI Duplex Tracer Controlled Hydromatic, with fixtures engineered by CINCINNATI.

A

B

Tracer Controlled

HYDROMATIC

Mills Uphill and Down

The Tracer Controlled group of Hydromatics, an offspring of the family of standard CINCINNATI Hydromatics, offers new possibilities in production milling which may be applied *now* in retooling for more economical production. And today's application of the tracer method of milling will suggest better machining methods when your war contracts terminate; when you must find a way to produce new things that will provide needed jobs.

Basically, Tracer Controlled Hydromatics accurately mill uphill and down, within the angle of inclination indicated in Figure 1. The longitudinal table feed and the vertical feed on the spindle carrier are actuated hydraulically and synchronized through a tracer valve mechanism which contacts a master template attached to the fixture. The profiles to be milled may be straight lines or curves, or a combination of the two. Even a box shaped profile can be handled in two operations. Four possibilities as sketched at upper left.

If you are faced with design changes or increased production schedules, perhaps the Tracer Controlled Hydromatics can be applied to meet the new requirements more quickly. Most certainly they deserve consideration in your post war methods planning. In either case, our engineers will be glad to assist with your plans.

Below: Duplex Tracer Controlled Hydromatic Milling Machine. Complete information may be obtained by writing for Catalog M-1295.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES · SURFACE BROACHING MACHINES · CUTTER SHARPENING MACHINES

• **Most foreigners** think that the anti-cartel statements of the Department of Justice are the viewpoint of the United States government. Nothing could be farther from the truth; that is, the State Department and the White House are not (for political reasons) ready to adopt a stand either for or against cartels. Congress still has to have its say.

* * *

• **Some informed** observers are saying the President does not care to let down his British friends who are seeking "economic cooperation" between England and the United States in cartel acceptance by this country, that he cannot afford to, but if he publicly took this stand before elections it would be a very powerful anti-fourth term argument.

* * *

• **The steel union** in asking for a guaranteed annual wage is literally asking the government to either take over or subsidize the industry. There is no doubt that the day will come when operations will naturally decline far below capacity, and it is equally certain that none of the steel companies could afford to keep employees on the payrolls when there is nothing for them to do because steel demand will have fallen into the doldrums.

The government would have to agree to take all of the steel sold if the union is to get this demand. If this happens to the steel industry, how far behind the steel workers are the employees of other industries going to be in making the demand?

Malleable Iron Casting Use by Railroads Restricted

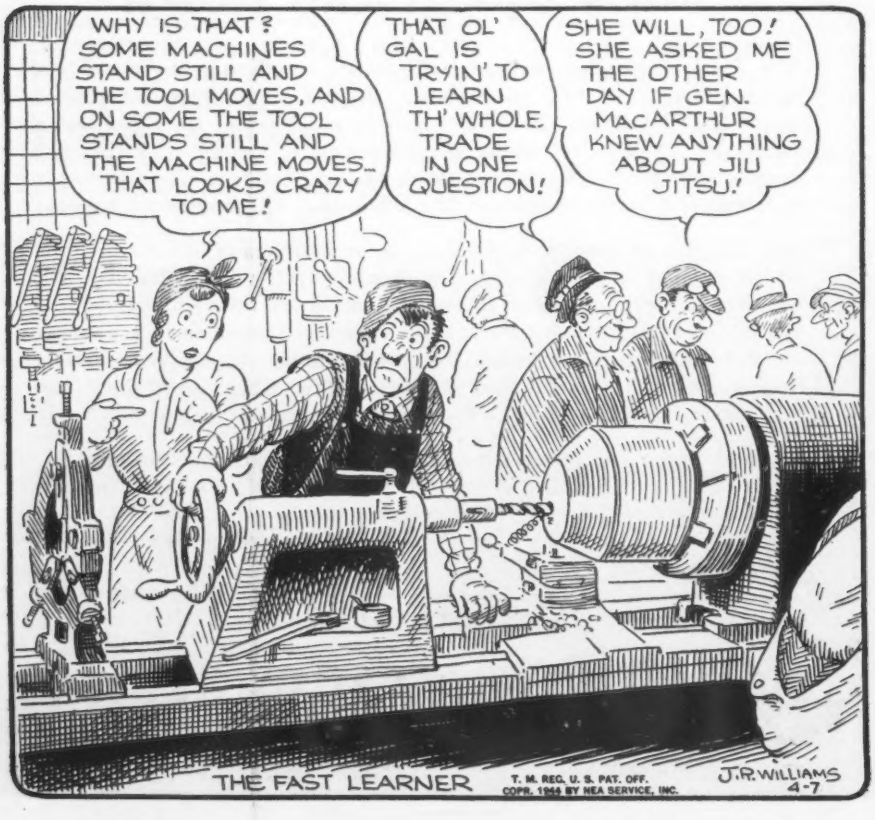
Washington

• • • **WPB extended** restrictions on the use of malleable iron castings and other materials in short supply by ordering that until further notice operators of transportation systems may not use quarterly quota ratings assigned them to purchase certain items of transportation MRO equipment.

Malleable iron hand-brake wheels cannot be acquired except for repair and maintenance purposes, WPB said. Operators are specifically prohibited from acquiring such equipment for conversion from the non-geared to the geared type. Acquisition of freight car (AB)brakes, other than for use as repair parts, and steel wheels are also restricted by the amended direction 1 of order P-142, effective April 1, 1944.

NASH SALES CHIEF: *Newly appointed as vice-president in charge of sales for the Nash division of Nash-Kelvinator Corp. is H. C. Doss, recently resigned as southeastern regional sales manager for Ford Motor Co. Mr. Doss succeeds L. S. Skutt at Nash, who resigned last week to take a franchise in the Denver territory for Nash-Kelvinator products.*

THE BULL OF THE WOODS — BY J. R. WILLIAMS


WHY IS THAT? SOME MACHINES STAND STILL AND THE TOOL MOVES, AND ON SOME THE TOOL STANDS STILL AND THE MACHINE MOVES... THAT LOOKS CRAZY TO ME!
THAT OL' GAL IS TRYIN' TO LEARN TH' WHOLE TRADE IN ONE QUESTION!
SHE WILL, TOO! SHE ASKED ME THE OTHER DAY IF GEN. MACARTHUR KNEW ANYTHING ABOUT JIU JITSU!
THE FAST LEARNER
T. M. REG. U. S. PAT. OFF. COPR. 1944 BY NEA SERVICE, INC.
J.R.WILLIAMS 4-7

Big Job Ahead for Engineers Predicted by Robert Gates

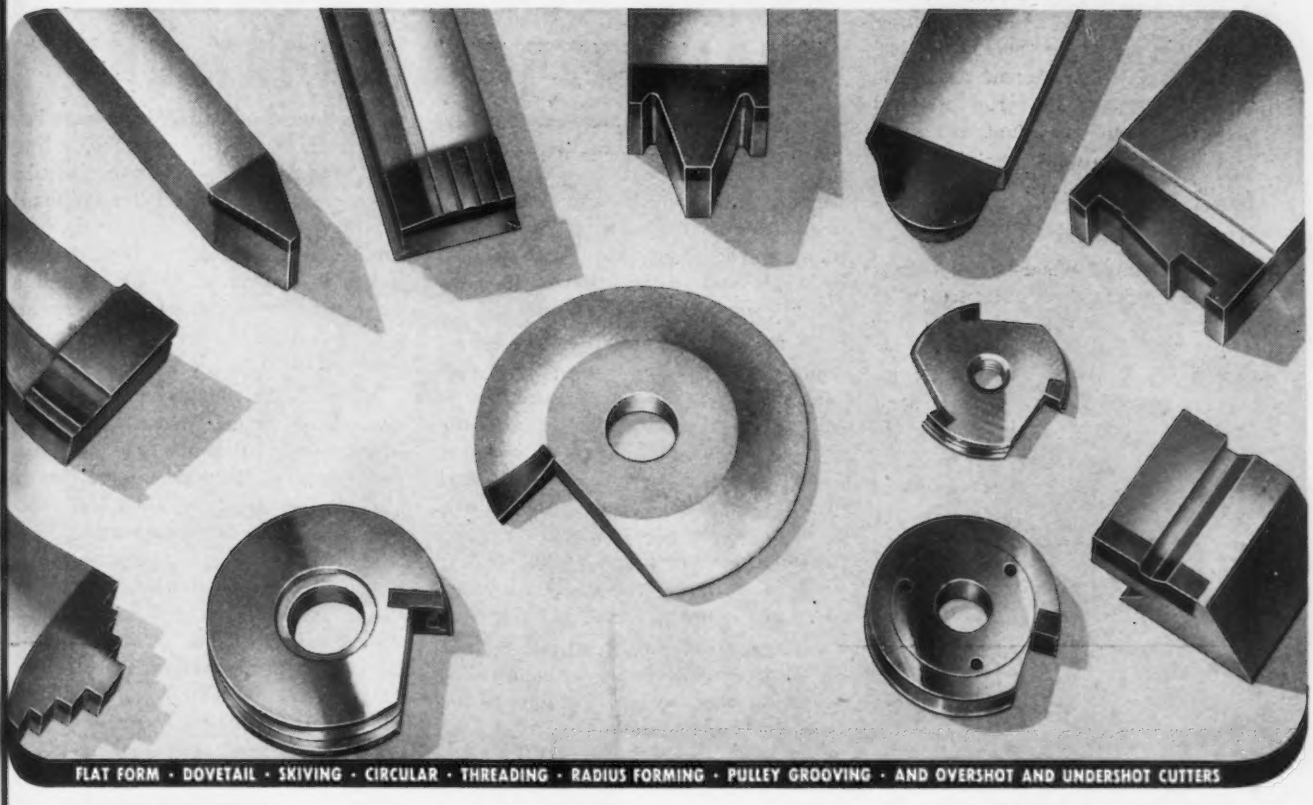
Birmingham

• • • **Praising the part** of engineers in war production, Robert M. Gates president of the A.S.M.E., at a banquet here on April 4, warned that the next twelve months will be the critical period of the war.

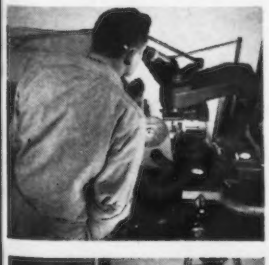
Mr. Gates' topic was "The Engineer in 1944—and after." He forecast a bright future for the profession.

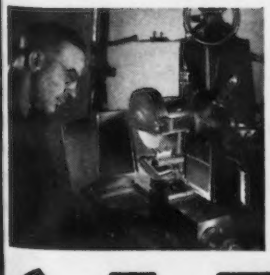
"There can be no doubt of the great future that is unfolding around the world for our profession," he said. "Mankind is on the march the world over. It needs engineers as never before. America can supply, and will be expected to supply, far more than any quota we have ever had available and we shall need more than ever here at home. They must be engineers well trained in modern technology—gifted with initiative, imagination and adaptability—conscious of social responsibilities. Let's bestir ourselves in this society to meet the challenge and the opportunity."

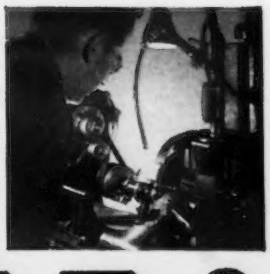
CARBOLOY FORM TOOLS



FLAT FORM · DOVETAIL · SKIVING · CIRCULAR · THREADING · RADIUS FORMING · PULLEY GROOVING · AND OVERSHOT AND UNDERSHOT CUTTERS







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Complete facilities are provided at Carboloy for the design and manufacture of Carboloy Form Tools of the highest quality, produced with maximum speed and economy. Manufacturing facilities include exclusively-developed equipment for rapid form and exact duplication of the carbide tips, optical grinders that provide —while grinding—constant "microscopic" check and control of area being ground, as well as conventional grinders equipped with specially designed fixtures.

This specially developed equipment, plus expert design service, precision workmanship, and "powder-to-hard-metal" control of Carboloy tip manufacture, combine to provide a form tool service of an unusually high order.

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For Cutting CAST IRON and Non-Ferrous Metals

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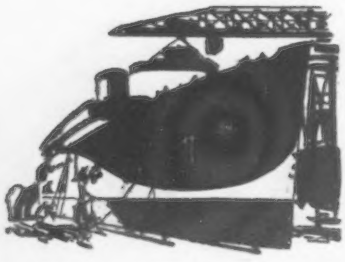
TUNGSTEN CARBIDES ★★★ TUNGSTEN CARBIDES WITH TANTALUM AND/OR TITANIUM CARBIDES

WEST COAST . . . OSGOOD MURDOCK

• Insistent, troublesome problem of satisfactory in-plant food in 30-minute dinner period for big outfits seems best solved with new fast feed yard units, combining turnstile, automat, and preserve features.



SAN FRANCISCO—Why all this talk, agitation and expenditure about in-plant feeding which, in plain language, means hot midday or midnight meals made conveniently available for shipbuilding, aircraft and other big industry workers? Why not continue to depend on the traditional dinner pail or more recent box lunch, particularly in the emergency?

Why did the airframe manufacturers of southern California appropriate $1,000,000 for development of joint food facilities? Why is Boeing at Seattle spending something like a half a million dollars of its money for cafeterias and portable service units?

Why do labor-management committees in the shipyards devote their major attention to solution of the in-plant feeding problem?

First factor is the 30-minute lunch period during which from 5000 to 20,000 workers with plenty of funds and big appetites in a 5 or 10 or 20-acre shipyard or aircraft plant want good, quick, hot food. Food is harder to get since rationing began, wives work too, and because of big bachelor barracks, bad transportation and market shopping difficulties, most workers can't depend on good, home-packed lunches.

Moreover, nutritionists and dietitians have proved beyond doubt that balanced meals served hot to workers produce better work and better workers. Although management has been initially indifferent and reluctant to invest in necessary facilities; labor leaders, Federal food authorities, professional nutritionists and the medical profession have steadily, consistently plugged the issue until the general principle and justification of in-plant feeding are now firmly established.

But how? There's the roughest rub, even after the stand-patter, old-fashioned argument over priciple is acknowledged and settled. Around the shores of San Francisco Bay about 250,000 workers are directly engaged in shipbuilding. Nine major yards each have over 10,000 workers and four of these are in the 30,000 worker class. In the four Kaiser Maritime yards at Richmond are 90,000 workers.

Since approximately 50 per cent of the entire personnel in each yard works on the day shift, some 19,000 men and women must eat in 30 min. in one yard, 17,500 in two other yards, 13,000 in another yard and 9000 or 10,000 in three other yards. Most of these workers work 8 hr. in the open air in active, manual work, and when it rains or is chilly and windy, as it is most of the time where these yards are located, these workers want hot food quick at midday and they will pay for it.

AT Mare Island in the leisurely, normal interwar days, the Navy had installed modern cafeteria facilities operated by civilian employees under Navy direction. Excellent food was always served both to enlisted personnel and to civilian civil service workers. In converting this yard to the biggest single operation around San Francisco Bay the in-plant feeding facilities were increased in proportion until the original cafeteria has been doubled to become a great central kitchen. There are now also two other cafeterias and mobile units throughout the yard. Workers can buy good meat entrees with considerable selection for from 60 to 65c. with hot coffee, soup and dessert if they wish. This represents actual cost and below, but the deficit is made up on canteen sales of candy and cigarettes.

As the Navy developed its new Hunters' Point Yard on the main San Francisco peninsula, a central kitchen was planned and built and 12 mobile units carry food to convenient stations about the yard. There have been no complaints with reference to Navy Yard food and, in fact, the Navy has set a standard which other shipbuilders are reluctantly following, even though it appears that their best interest will eventually be served in more production, less turnover and greater satisfaction among the workers.

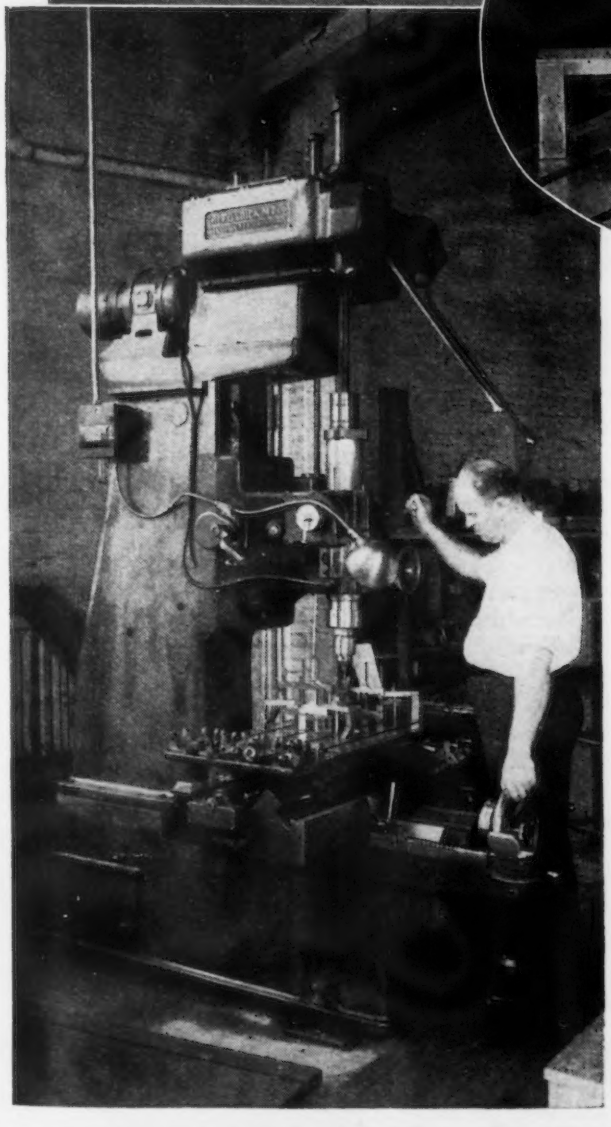
Most of the old, private yards depended on small, inadequate poorly run catch-as-catch-can private eating joints outside the gates, so no central kitchen facilities were planned. With enlargement and intensification of activity, there is even less space and opportunity for installation than at the start. It has been estimated that it will cost $100,000 to install a central kitchen at Richmond to provide adequate in-plant feeding for the 90,000 workers at the four Kaiser yards around the inner harbor there. Although practically no effort has been made at Richmond, either by the management or the Maritime Commission, to provide any hot in-plant feeding facilities there seems to have been least agitation and complaint there. Nothing but meager supply of cold box lunches is now available in these yards, and the nearest eating facilities are outside the gates and in neighboring housing projects. As at most yards, office personnel are provided for fairly well.

ORGANIZED labor seems to have selected Bethlehem for its test case and cause celebre. This is a crowded, old-time, well-managed, long-run yard, closest to downtown San Francisco and directly on the peninsula. Distances in the yard are not so great but the little short order restaurants outside the gates were soon overrun between 30-min. noonday whistles and a former concessionaire who provided unsatisfactory food inside the yard was finally boycotted and run out by the workers themselves. Then followed gestures and resolutions by the city supervisors, by nutritionists, by labor management committees and by conferences with the Navy and Maritime authorities. After long, drawn-out negotiations and much grousing by all concerned, a new feeding system is being developed which promises not only to solve

Simplifies

PRECISION DRILLING, BORING AND TAPPING OPERATIONS

FOSDICK *Jig Borers*



• The Fosdick Jig Borer is ideal for handling a job of this type which requires drilling, boring and tapping operations on a limited number of pieces. The piece is an "Indicator bracket for a ball bearing radial looseness gauge". Set-up is as follows: A sub-plate is mounted on the table containing two bored pin holes, one of which is used to locate from central hole by means of a pin. Four holes are bored and three screw holes spotted in this position. Then the sub-plate is mounted on an angle plate and a second pin inserted into one of previously bored holes. Two more holes are then put in the work at right angles to the first ones and location is determined from the two dowel pins.

Operations performed — Drill 2 — .250" dia. holes, 1 — .625" dia. hole — 1 — .498" dia. 7/8" deep hole and 3 center drill spots — 2nd operation — Drill 1 — 17/64" dia. hole — tap 1/4" dia. hole #20 tap — 2 — 5/16" dia. holes #18 tap in line.

Fosdick Jig Borers have gained a wide reputation in tool rooms — tool shops and in production shops where accuracy and flexibility are essential to rapid production at low costs.

Consult a Fosdick Engineer on your work and the possibilities for handling it more economically on a Fosdick Jig Borer.

Full details of construction — operation — and application are found in Jig Borer Bulletin — J.B.I. Write for yours.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

the problem here but to set a precedent and establish a practical plan applicable quite universally.

A man named Sprott and his associates were awarded the new concession and they have worked out what they term a "Fast Feed System" and a detached unit that looks like an answer to the interminable prayer. A big central kitchen has been set up in a building provided by the management, with cooking and catering facilities adequate to take care of all the 19,000 total workers in the yard who wish hot food at midshift dinner time. From this central kitchen, temporary mobile units have carried hot food around the yard. But shortly a number of the new "Fast Feed Turnstiles Units" will go into action. Each unit consists of a bank of heated and air conditioned shelves, thermostatically controlled, with a removable plate in front of them and an attendant behind. Four of these self units will normally be grouped beside each other, each approached through a turnstile and a short pipe-railed aisle in-coming and out-going and each providing different entrees. Serving from 400 to 500 in 5 min. with only two attendants will permit reduction in the cost of the food and maintenance of quality.

FOR interior installations, where big cafeterias are already installed but found cumbersome because of slow moving lines, Sprott has worked out a "Fast Line Feed" service. Here the usually long cafeteria serving front is divided into 6 ft. segments, each reached through a transverse aisle. A single entree is served to each line and a master turnstile permits entrance to any of the lines.

Sprott's organization is now feeding some 85,000 workers every 24 hr. in the San Francisco and Los Angeles areas. Two warehouses, completely equipped with meat processing plants and produce departments, are operated to serve the various units. Sprott now serves Bethlehem's and Western Pipe & Steel's San Francisco yards, two military student messes on the campus of the University of California in Berkeley and Marinship's cafeteria and yard service at Sausalito. In the Los Angeles area meals and housing are provided for training detachments at North American and Lockheed-Vega and at Metropolitan Airport and the Edgewater Club Hotel at Santa Monica occupied by the Army Air Forces.

Where less workers are involved, like the 500 at Soulé Steel, the problem is easier and the solution even more decisive in its positive, constructive result. Soulé has demonstrably increased production and held its workers with a fine in-plant cafeteria, just enlarged and modernized. Here the management absorbs part of the cost, and service prices have not been increased over the prewar level.

At the Eitel McCullough radio plant in San Bruno, the management has a resourceful and skilled professional nutritionist as manager of the cafeteria. She is working on a long-time educational program to improve the health and especially the nerves and eyesight of her workers. Vitamin diets and balanced meals are planned with "necessity foods" and "fun foods." A second helping of "necessity foods" is free but there is an extra penalty for a second helping of "fun foods." Playing on the changes in color, psychology and cookery, the health and disposition of all these workers has been notably improved.

In-plant industrial feeding seems to have become far more than just another labor beef or high-minded objective of the do-gooders. It can pay dividends in production and in health and contentment of a more stable labor force in big industry.

Boeing Sets New Bomber Output Record in March

Seattle

• • • **More four - engined** bombers were produced by Boeing Aircraft Co., at Seattle during March, 1944, than ever have been turned out by a single plant, according to P. G. Jonson, president. March production exceeded that of January by 34 per cent and was over 2.5 times the volume of the first month of 1943.

The same number of direct factory workers have been able to quadruple production in the past two years, even though unskilled replacement workers have been regularly brought in to maintain a constant labor force. More than 50 per cent of Boeing's production workers are now women. Production for 1943 was at the rate of 3.23 lb. per month of airframe per square foot of factory floor area. During March, the average was 4.85 lb.

Western Can Makers' Tinplate Limitations Eased

Washington

• • • **WPB announced** on April 3 that inventory restrictions on acceptance of tinplate for the manufacture of cans in Washington, Oregon, California, and Utah have been relaxed to permit can manufacturers to accept deliveries of material that will be needed to be put into process within 90 days of acceptance. This action, which is effective until Sept. 30, 1944, was taken because of the seasonal nature of the West Coast packing industry and is similar to an inventory exception that was granted to the same group of can manufacturers last year.

J. L. Block Named Deputy Director of Steel Division

Washington

• • • **The WPB** Steel Division's new deputy director is Joseph L. Block, executive vice president of the Inland Steel Co. Mr. Block was previously assistant director in charge of program and distribution branch.

. . . Cited for Awards . . .

• • • **The following** companies have won the Army-Navy E award for outstanding war production:

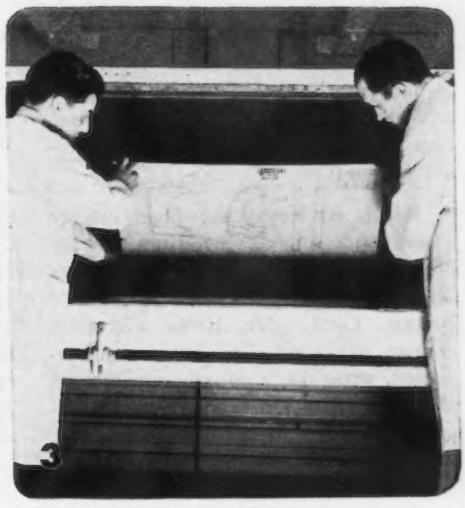
Soule Steel Co., Los Angeles Plant, Los Angeles.
Metals Refining Co. Division, Glidden Co., Hammond, Ind.
Artos Engineering Co., Milwaukee.
The Bead Chain Mfg. Co., Bridgeport, Conn.
The Buda Co., Harvey, Ill.
Cheney Bigelow Wire Works, Springfield, Mass.
Crown Products Corp., Philadelphia.
M. M. Davis & Sons, Inc., Solomons, Md.
Fafnir Bearing Co., Holland Division, Holland, Mich.
Firestone Tire & Rubber Co., Nebraska Ordnance Corp., Nebraska Ordnance Plant, Fremont, Neb.
M. P. Heinze Machine Co., Chicago.
Hemphill Co., Pawtucket, R. I.
Industrial Brownhoist Corp., Bay City, Mich.
Price Brothers Co., Frederick, Md.
Procter & Gamble Defense Corp., Gulf Ordnance Plant, Aberdeen, Miss.
Radio Corporation of America, RCA Victor Division, Lancaster Plant, Lancaster, Pa.
St. Regis Paper Co., Panelyte Division, Trenton, N. J.
Speed-O-Print Corp., Chicago.
Spicer Manufacturing Co., Hillsdale Steel Products, Hillsdale, Mich.
Superior Tube Co., Norristown, Pa.
Worthington Pump & Machinery Corp., Worthington-Gamon Meter Co., Newark, N. J.

HOW TO GET *Accurate* PHOTO TEMPLATES *Fast*

Pictures on this page show key steps in the production of master templates by the fast, accurate X-Ray photo method. In many aircraft plants ARMCO Galvanized PAINTGRIP sheets are used for this time-saving, money-saving process. PAINTGRIP's Bonderized surface takes and holds paint. It does not smudge, peel or flake. Sheets are smooth, flat and easy to work.

In making a negative "plate," white lacquer is sprayed on ARMCO PAINTGRIP sheets. They are then coated with a fluorescent lacquer, followed by a light green "masking" coat. When the template design is made, lines scribed into the fluorescent base coat result in a fluorescent outline of the pattern when it is activated by X-Rays.

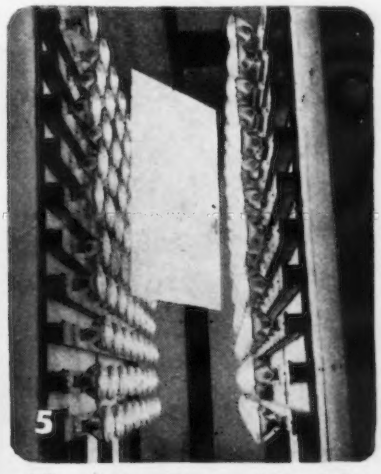
For reproductions, other white-lacquered sheets are made "positive." Here the front roller coats the sheet with a welding solution. Coming up from another roller is the matte transfer paper, the emulsion side of which is laminated to the sheet by pressure rollers. This paper renders the surface sensitive to light.



Here the master negative is being placed in contact with the sensitized sheet in the after-glow vacuum press preparatory to "printing". When the two sheets are pressed tightly together in a vacuum, contact between negative and positive sheets is perfect, assuring a sharp pattern.

PHOTOS BY NORTH AMERICAN AVIATION, INC., OF KANSAS

The operator is removing the positive template print from the developing solution. Ordinary photographic chemicals are used in this process, after which the image is fixed in a hypo bath.



When the positive template print has been developed, fixed and washed, it is passed between two banks of infra red lights. In 45 seconds it is completely dry and is sent to the Loft department for use in the production of parts and tools for America's air forces.

MADE OF ARMCO GALVANIZED PAINTGRIP

Write us for information on ARMCO Galvanized PAINTGRIP sheets for war applications—or for products you may be thinking about for the days of peace.

THE AMERICAN ROLLING MILL CO.

1151 Curtis Street, Middletown, Ohio

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

PERSONALS

• **Walter J. Maytham, Jr.** has been appointed industrial manager, Northwestern district, of Westinghouse Electric & Mfg. Co., with headquarters in Chicago, succeeding **R. L. Irvin**, who has been named to a new post at the Westinghouse Lima plant.

• **Robert S. Durling**, until recently purchasing director of Monitor Controller Co., Baltimore, Md., has been appointed director of industrial relations.

• **Philip L. Thomson**, director of public relations of the Western Electric Co., New York, retired under the company's pension plan after 41 years of service. He will be succeeded by **Fred B. Wright**, an executive of the company.

• **Thomas A. Hughes** has been made manager of air conditioning advertising for Westinghouse Electric Elevator Co., Jersey City, N. J. Before he joined Westinghouse he was assistant advertising manager and sales promotion manager of the Underwood Elliott Fisher Co.

• **Ralph S. Howe** has been elected vice-president and manager of the New Britain-Gridley Machine Division, New Britain Machine Co. New Britain, Conn. Mr. Howe will have charge of sales. He has been connected with the company since 1920 and recently held the offices of treasurer and factory manager. **Julian C. Pease** has been elected assistant secretary and factory manager of the machine tool division and **William J. Lofgren** has been elected treasurer to succeed Mr. Howe.

• **D. J. Stewart**, previously assistant general manager of Barber-Colman Co., Rockford, Ill., has been made vice-president and general manager of the company, succeeding Earle D. Parker. **H. F. Collins**, former assistant general superintendent, has been appointed works manager.

• **E. F. Patterson**, formerly manager of the Mansfield, Ohio, plant of Stran-Steel Division of Great Lakes Steel Corp., has been made plant manager in charge of all Stran-Steel plants, with headquarters in Detroit. **R. L. Kretschmar**, co-ordinator of production, formerly in Detroit, will become manager at Mansfield.

• **Donald E. Jenkins** has been made supervisor of industrial relations at the Cleveland lighting division of the Westinghouse Electric & Mfg. Co., Pittsburgh.

• **E. F. Blank**, director of personnel relations for Jones & Laughlin Steel Corp., Pittsburgh, has been appointed substitute industry member of the National War Labor Board. Mr. Blank, who has been associated with the steel industry for the past 18 years, is past president of the Pittsburgh Personnel Association. He has been industry member of the Third Regional War Labor Board in Philadelphia for more than a year. Mr. Blank resigned his position with the Regional Board to accept the appointment with the National Board.

• **L. S. Egea** has become sales engineering representative on the West Coast for the Selas Co., Philadelphia. Mr. Egea has had wide experience in the power plant and industrial furnace fields, and carries technical qualifications in the refractories, automotive, ceramic, heat treating and enamelling industries.

• **John A. McCone**, former executive vice-president, is now president of the California Shipbuilding Corp., at Wilmington, Cal. **S. D. Bechtel**, former president, becomes chairman of the board. **Jerome K. Doolan**, general manager, succeeds Mr. McCone as executive vice-president.

• **J. L. Hench** has been elected a director of Knapp Brothers Mfg. Co., Joliet, Ill., and also president and treasurer of the company. **Mrs. Henrietta F. Knapp**, formerly president, retired from her executive responsibilities to become chairman of the board of directors and assistant treasurer.

• **Robert E. Crockett** has joined H. A. Brassert & Co., New York. Mr. Crockett has been in active charge for many years of ore mining properties and concentrating plants in the East.

• **Cason J. Callaway** of Hamilton, Ga., has been elected a director of the U. S. Steel Corp., to fill the vacancy in the board created by the death of James A. Farrell. Mr. Callaway was president, then chairman of the board of directors of Callaway Mills of La Grange, Ga., from 1920 to 1938 and for many years he occupied a prominent place in the textile industry of the nation.

RALPH S. HOWE, vice-president and manager, New Britain-Gridley Machine Division.

E. F. BLANK, substitute industry member of the National War Labor Board.

CASON J. CALLAWAY, director of U. S. Steel Corp.

WILLIAM A. ROBERTS, WILLIAM C. JOHNSON, and JAMES M. WHITE, left to right, vice-presidents of Allis-Chalmers Mfg. Co.

• **P. J. Potter** has been appointed production metals engineer for Federal-Mogul Corp., Detroit. In his new position he will have charge of all metal production and fabrication operations.

• **Robert H. Beard** has been appointed purchasing agent at the Empire Steel Corp., Mansfield, Ohio, succeeding **H. O. Simmons**, who recently resigned. Mr. Beard has been with the company for 20 years in various capacities.

• **A. F. Rucks** has recently been elected president and general manager of C. J. Tagliabue Mfg. Co., Brooklyn, succeeding the late C. D. Waters.

• **C. F. Nagel, Jr.**, chief metallurgist of the fabricating division, has become chief metallurgist of a newly created metallurgical division of the Aluminum Co. of America, Pittsburgh. **T. W. Bossert**, who has been in Mr. Nagel's department since 1930, serving as assistant chief metallurgist of that division for the past nine years, succeeds him. **C. L. Dunham** was made chief metallurgist of the reduction division and **H. J. Rowe** has been promoted to chief metallurgist of the castings division, with headquarters in Pittsburgh.

• **Walter J. Truettner**, formerly with the Dow Magnesium plant at Marysville, Mich., has been placed in charge of the new Dow Chemical Co. sales office in Detroit, which opened April 1 in the Fisher Building.

• **David Thomson** has been made president of the Phoenix Iron Co., Phoenixville, Pa., filling the vacancy caused by the recent death of Samuel J. Reeves.

• **William C. Johnson, James M. White** and **William A. Roberts** have been made vice-presidents of Allis-Chalmers Mfg. Co., Milwaukee. Mr. Johnson previously served as general sales manager, coming to Allis-Chalmers in 1924. Mr. White was formerly made manager of the company's La Porte, Ind., works, and later became works manager in Milwaukee. Mr. Roberts joined the company as a salesman, and later became agricultural sales manager and then manager of the company's tractor division.

OBITUARY...

FREDERICK F. McINTOSH, deceased, former director of metallurgy, Crucible Steel Co. of America.

• **Frederick F. McIntosh**, director of metallurgy, Crucible Steel Co. of America, died on Feb. 23, at Sewickley, Pa., after a short illness. Mr. McIntosh was connected with the Crucible Steel Co. and Bethlehem Steel Co. before he was appointed assistant professor of metallurgy at Carnegie Institute of Technology. After serving as a Major in the Army, in 1926 he returned to Crucible as chief metallurgist and became director of metallurgy in 1939. He remained in this capacity until his death.

• **Otto R. Lindstrom**, superintendent of the Ford Motor Co. tool and die shop at River Rouge, died March 24. He had been with Ford for the past 30 years.

• **Edmund D. Monk**, consultant on power transformer sales, General Electric Co., Pittsfield, died March 16. He went to Pittsfield in 1909, in 1912 was transferred to Schenectady, later to Cincinnati and returned to Pittsfield in 1924.

• **Dr. V. N. Krivobok**, well known stainless steel metallurgist and former professor of metallurgy at Carnegie Institute of Technology for many years, has become associated with the development and research division of the International Nickel Co. at New York.

• **J. D. Zaiser**, former assistant general manager, has been made executive vice-president of Ampco Metals, Inc., Milwaukee, and **George Dreher**, superintendent of manufacturing, has been made a vice-president.

Fatigue Cracks . . . BY A. H. DIX

"Make Mine Bourbon"

• • • In cleaning out the compost heap in the back of our lower desk drawer, we ran across Hirohito's entry in Japan's 1937 annual imperial poetry contest. As you may have forgotten it, we repeat it:

Peaceful is morning in the shrine garden;
World conditions, it is hoped, will also be peaceful.

The second line entitles H. to a place alongside Richard Whitney, ex-head of the New York Stock Exchange, in the gallery of mistaken hopers on a cosmic scale. Like many Jerseymen, Whitney acquired a fondness for applejack, which is our home state's chief claim to fame. He hoped it would attain equal ranking with rye and bourbon as a national drink, and backed up his hopes with heavy investments in local distilleries. But the national palate continued to regard "Jersey lightning" as something exotic, like vodka, with consequences disastrous to Richard W.

Which shows what happens to people who operate without adequate knowledge of the market. This, dear reader, is a fate from which you are protected, for in every important industrial center your favorite family journal has a hawkeyed watcher, who pounces on every new development the instant it pokes its head above ground. He weighs, measures, smells and Magnafluxes it. He does not permit himself the luxury of prognostication, but his reports will enable you to fill in the major curves in the shape of things to come.

Mildewed Mot

• • • In our compost heap we also found a frayed note from Gerard Frazar, your New England ear-to-the-grounder, to the effect that Henry Dionne, of the Tod-Bath shipyard at South Portland, Maine, claimed the national riveting championship. Working with a double crew, he drove 2864 high tensile rivets in seven hours and twenty minutes, beating a Great Lakes record by 95 rivets.

At the time we intended to wisecrack that the Dionnes were high producers, but it is a little late now that the other Dionne's score has been tied by a South American.

No Seventh Sons They

• • • At the bottom of the heap we found a copy of the *New York World*, dated Oct. 29, 1929, headlined:

BIG CRASH STUNS WALL STREET
Administration is Surprised;
Reserve Board Not Worried.
Slight Business Recession
Feared at Capital

On the back pages an item headed, "INVENTOR FIGHTS SUBMARINE BAN. French inventor says abolition would leave France Helpless. Undersea craft hope of small nations; a pledge of peace, asserts Laubeuf."

General Throws Snake Eyes

• • • Speaking of the hazards of crystal gazing, one of the many things we admire in our favorite military man, General Marshall, is that he always says no to invitations to make pleasant predictions. He is strictly a fact man, and we wish his helpers would follow his example. Too many of them give in to the temptation to peer into the future, with results that indicate they never bothered to be fitted for bifocals.

We are as fond as the next one of a reassuring guess by an expert, and our heart warmed when General Eaker predicted, during the cloudburst bombing of Cassino, that it was all over. The fact that he guessed exactly wrong reinforces our conviction that military men, like doctors and bridge designers, should lay off tea leaf reading.

Unwanted "R"

I see by page 61 of your Mar. 23 issue that current control for a storage battery resistance welder is furnished by "a pneumatically actuated contractor."

Must be the same fellow who shingled a house for me some years ago. Every time the wind blows the shingles flutter.

—*Deac*

Stopper

• • • You wouldn't put splints on a toe dancer—*Hazard Wire Rope Division, American Chain & Cable Co.*

Recluse Gets Outing

• • • Ever since Christopher Morley took it out for an airing many years ago, *maculate* has been one of our favorite words. After the Morley excursion *immaculate's* serled opposite crawled back into the dictionary and we had not seen it until your f.f.j. dragged it into the bright light by using it in the series of seized foreign patents for metal products. We quote from page 126 of the Mar. 23 issue:

APC Patent 1,957,260—Machine for separating maculate parts of sheet paper. A. Gayler, Germany, 5-1-34.

Omnimodous Garage

• • • Another foreign patent that fascinates us is No. 2,028,476:

Garage for automobiles and the like. J. Rome and K. Rubinstein, France. 1-21-36.

We lie awake nights wondering what is like an automobile but isn't.

Postwar Headache Cure, 30c

• • • So many readers wrote us for extra clippings of the foreign patent lists that we ran out of copies and had to reprint them. The 34-page reprint briefs some 2500 patents, arranged in classes: *Aeronautics, Metal Bendings, Rivet Setting, Metal Tools and Implements, Heat Exchange Devices, Miscellaneous Hardware, Boring and Drilling, Furnaces, Gas Turbines, Metallic Receptacles*, and practically everything else that might come up in your postwar dreams.

The reprint cost us about 30c. a copy, and we will part with one for the same sum in stamps. It tells you how to go about getting copies of patents, and even a manufacturing license itself, if you want to go that far.

Aptronyms—and Orchid

. . . On Mar. 16 you mentioned Dr. Frank G. Slaughter, author of the new book "Air Surgeon." When he was an interne at Jefferson Hospital, Roanoke, he and his associate would introduce themselves thus, "We are two surgical internes at Jefferson Hospital and our names are Peirce and Slaughter."

When I was a melter foreman at the Lackawanna Steel plant in Buffalo there was a laundry in town named the Shirtzon Laundry Co.

I thoroughly enjoy the able editorials of Mr. Van Deventer.

—*Carl W. Peirce*

Puzzles

• • • Last week's hat buyer's check was for $14.32.

We have had several complaints that the frog in the 20 ft. well could not have climbed out in 18 days if he climbed 3 ft. each day and slipped back 2 ft. each night. We tried again and find that 19 days is the correct answer. Sorry.

This is from A. M. Silverstein of the Consolidated Steel Corp. Ltd., Los Angeles 22:

You have a rectangle of steel plate measuring 9 ft. by 16 ft. How can you cut this into two pieces that can be fitted together and welded to form a 12 ft. by 12 ft. square?.

Northern SUPER-CRANES

MATERIALS HANDLING CAN'T BE SUBCONTRACTED

If a lathe, shaper, milling machine or other tool breaks down you may be in serious difficulty. But work can be subcontracted –ways found to meet the emergency.

But if a crane breaks down, the shop it serves is tied up until repairs are made. Materials Handling is one job that *can't* be subcontracted. You *have* to have reliable cranes for the heavy load of war production.

NORTHERN USERS HAVE ASSURANCE OF RELIABILITY IN THESE EXCLUSIVE FEATURES:

1. Rigid one-piece welded steel trolley construction.
2. Transmission type single unit, oil tight gear reduction.
3. Easily removable gear case covers. Splash lubrication of gears.
4. Heavy section girders designed for extreme lateral and vertical loads.
5. Heavy duty roller bearings, turned and ground shafts, press fits on gears, wheels, etc.
6. Standard heavy duty anti-friction bearing crane motors—oversize for severe service.
7. Control equipment built by the outstanding specialists in industrial control.
8. Special heavy duty crane wiring construction to insure safety and eliminate wiring troubles.
9. Unit bridge drive mechanism combined with heavy welded steel end trucks.
10. Hoist and bridge brakes designed for extreme loads and hard service.

NORTHERN ENGINEERING WORKS

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Dear Editor:

BROACHING VS. MILLING

Sir:

What books are available on the use of the broach for machining operations vs. other methods both for female and male operations?

E. W. BERGER,
Chief Manufacturing Research
Consolidated Vultee Aircraft Corp.,
San Diego, Cal.

● O. W. Boston's book, "Metal Processes," has a fairly comprehensive chapter on broaching and considerably more data on milling. The book is one of the best available on machine shop practice generally. The publisher is John Wiley & Sons, Inc., 440 4th Ave., New York. Price is $5. The Broaching Tool Institute, 74 Trinity Place, New York 6, is about to put on the press its text book, "Broaches and Broaching." Milling machine builders issue technical manuals on the application of their equipment. One of them, the Cincinnati Milling Machine Co., Cincinnati, manufactures both broaching and milling machines. It has a comprehensive manual on milling and may be able to furnish you with technical information on broaching.—Ed.

NE STEEL CHART

Sir:

Enclosed find 25c for which please forward one copy of your famous IRON AGE NE Steel—Standard Steel Chart. Admittedly, said chart is out of date, but we still find it the most useful of its type in existence.

W. P. JAMES,
Ensign, U.S.N.R.
U. S. Navy Yard,
Portsmouth, N. H.

BRACKELSBERG FURNACE

Sir:

Have you published any articles on the Brackelsberg furnace?

W. J. REAGAN,
Research Metallurgist
Copperweld Steel Co.,
Warren, Ohio

● We have had nothing on this for several years. The most recent extensive article on the subject appeared about a year ago in the Foundry Trade Journal (English).—Ed.

TITANIUM PRE-DIPPING

Sir:

Whom may we contact for additional information on the titanium pre-dipped process for zinc coatings discussed on page 55 of your Feb. 3 issue?

L. N. WILLIAMS
Guide Lamp Div.,
General Motors Corp.,
Anderson, Ind.

● Write to Hendley N. Blackmon, Director of Technical Publicity, Westinghouse Electric & Mfg. Co., East Pittsburgh.—Ed.

DIE CAST FUSE BODIES

Sir:

I would very much like to have an extra copy of "Die Casting of Fuse Bodies," by H. E. Sheppard, in your Feb. 17 issue. This is the first time I have seen a manufacturing drawing with all the gage dimensions, such as given in Fig. 2a. It is a fine job!

O. W. BOSTON
College of Engineering,
University of Michigan,
Ann Arbor, Mich.

SEIZED PATENTS

Sir:

Please send us another copy of the Mar. 9 issue, as pages 107 to 124 are missing in our copy and pages 125 to 140 were duplicated. We would not trouble you were it not for the fact that the missing pages bear lists of the alien patents which we are keeping for our files.

D. A. COTTON,
Process Laboratory
Delco-Remy Div.,
General Motors Corp.,
Anderson, Ind.

● About once out of every 100,000 copies the collating machine skips a beat. A perfect copy is being sent you. Incidentally, all the foreign patents up to and including the issue of Mar. 16 have been reprinted in a 34-page booklet. A copy can be obtained from the Reader Service Dept. for 30c in stamps.—Ed.

TOOL STEEL DIRECTORY

Sir:

I am heat treater for the Aeronautical Division of the Minneapolis Honeywell Regulator Co. In heat treating the many kinds of steel used in the making of instruments, I find that your Directory of Tool Steels is a great help. In it I find a wealth of material which I have failed to find anywhere else. Up to the present time, I have borrowed this book from a friend of mine who is now moving to California, which means that I will be without this directory which has helped me so much. I would appreciate very much your sending me a copy C.O.D.

LARS V. ANDERSON
2209 E. 33rd. St.,
Minneapolis, Minn.

● The price of the directory is $1. Six or more copies, 50c each.—Ed.

CONTINUOUS CASTING

Sir:

Could I get six reprints of Mr. Lippert's article, "Continuous Casting," in your Feb. 24 issue, one for each of our metallurgy instructors?

RALPH G. GILLESPIE,
Head of Metallurgy Dept.,
Ford Airplane School
Ford Motor Co.,
Willow Run Bomber Plant,
Dearborn, Mich.

Sir:

In your Apr. 4 and Apr. 11, 1940 issues was published an interesting two-part article on continuous casting of metal. Are reprints available?

F. S. STICKNEY,
Chief Engineer
Instrument Specialties Co.,
Little Falls, N. J.

● We have no more reprints of that article but see the more up-to-date study in the Feb. 24 issue.—Ed.

COMPARABLE ELECTRODES

Sir:

Have you any more copies available of "Comparable Arc Welding Electrodes" published in your May 13, 1943 issue. If so, will you send us two copies?

V. A. TERRY,
Material Control Div.
Bendix Products Div.,
Bendix Aviation Corp.,
South Bend 20, Ind.

● Reprints have been mailed, 15c each.—Ed.

TRICLORETHYLENE SOLVENTS

Sir:

We are very much interested in "How to Use Triclorethylene Solvents" which appeared in your Mar. 9 issue. Are reprints available?

E. N. POTTER,
Plant Engineer
International Harvester Co.,
1714 West Bruce St.,
Milwaukee, Wis.

● No reprints have been made but a clipping has been sent you.—Ed.

Sir:

Please send us a clipping of the article, "How to Use Triclorethylene Solvents." We would appreciate it if you would send this as soon as possible.

B. E. HOTELLING,
Methods Department
Bolens Products Co.,
Port Washington, Wis.

TOOL LIFE INCENTIVE

Sir:

We are much interested in information on perishable tool life incentives. Did THE IRON AGE publish any articles on this subject? We will welcome any type of literature that you can forward us, as this subject is vitally important in our production set-up.

R. M. HISLOP,
Perishable Tool Dept.
A. O. Smith Corp.,
Milwaukee, Wis.

● We have published considerable information on tool salvage methods but nothing on tool life incentives. Some of the larger companies have set up plans to induce employees to take better care of cutting tools. If any of those are able to spare printed literature on the subject we hope that they will see this and send it to you. Meantime we suggest you communicate with John Welles, Division of Information, Conservation Division, War Production Board, 1100 H Street, Washington, who can doubtless supply you with plenty of literature on the subject.—Ed.

BATTLEFIELD SCRAP

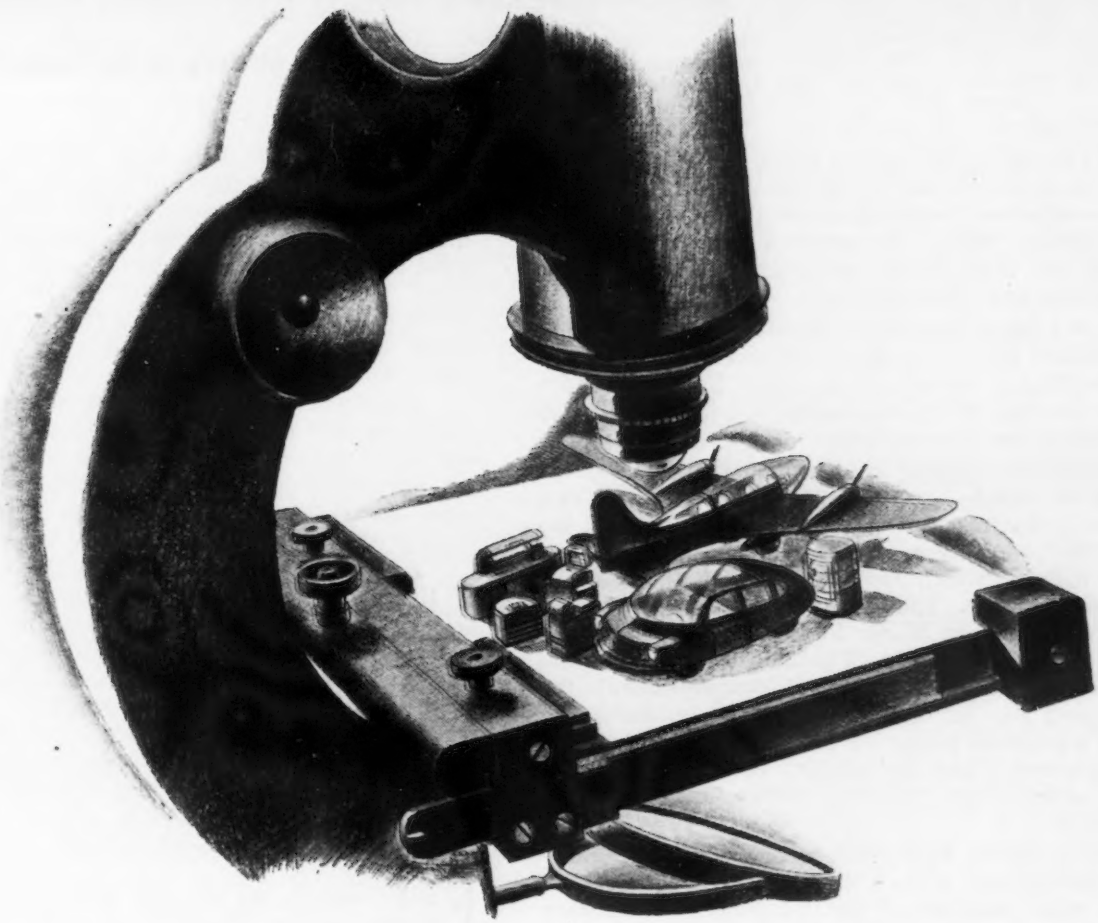
Sir:

In the "Metal Bulletin" (English) Nov. 26, just received, I found an article on "Local Preparation of Battlefield Scrap," written by Max Stern of Loma Machine Mfg. Co., Inc., New York, taken from your paper. I feel sure that Mr. Stern, who is a very good friend of mine would appreciate it if you would give me his address.

HANS FRIEDLAENDER
P. O. Box 1905,
Tel-Aviv, Palestine

● Loma Machine Mfg. Co., Inc., 580 Fifth Ave., New York City.—Ed.

POSTWAR BUYERS WILL BE FUSSY



With all signs pointing to continuance of high manpower rates, sound postwar planning must include a way to offset them by other savings. Full employment of modern machine tools is one self-evident solution, if we are to keep prices down and attract postwar buyers in large numbers.

These buyers will, we believe, be particular about quality and price. They will not recklessly rush to the markets when consumer goods are once more available. They have become accustomed to doing without, and they will buy only what looks good to them, in every way.

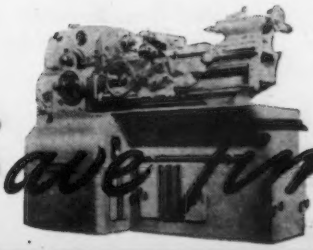
So, the machines to produce these goods must keep costs down without reducing quality. Many wartime machines (perhaps old even before the war) have lost their keenness, and must be replaced if prices are to fit consumers' pocketbooks.

Monarch engineers have always been alert to cost-cutting developments in lathe work. They have devised many turning short cuts for war production that are equally valuable for peacetime goods. Special Monarch equipment not available heretofore can now be delivered with reasonable promptness. For war production, priorities may be obtained for new Monarch lathes that will relieve manpower shortages.

We invite your inquiries for current delivery, or your request that we check your postwar plans, to see how Monarch lathes may be applied to help you produce more goods for more people, at lower cost.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES *Save time*



This Industrial Week . . .

- **Steel Industry Sets Production Record During March**
- **Achievement Remarkable in View of Many Obstacles**
- **Manpower Question Causing Worry in All Industries**

TYPICAL of the way in which U. S. industry has vanquished obstacles all through the war, steel companies succeeded in setting production records during March in spite of manpower losses, strikes, the necessity of repairing badly overworked equipment, and other hurdles.

Total ingot output last month exceeded the unprecedented tonnage made during last October. Credit for the feat is shared all down the line, with much praise due for skillful management, adept scheduling, and daring use of equipment.

Production experts are very doubtful that current high levels can be maintained for any length of time. It is said that much steel is being lost each week because the proper labor is not available to meet steel mill schedules, which have been set on the basis of past performance. The shutdown of one open hearth furnace in Ohio on March 27 definitely was credited to the lack of manpower. The industry was told officially last week that it can expect few deferments for men under 26. At the same time the industry presented a program proposing close cooperation between the government and the industry in regard to deferments, absenteeism, turnover, strikes, and the hiring of women.

Flash strikes have risen to new peaks of annoyance, particularly in the Pittsburgh area. Several occurred while members of the WLB Steel Panel were making an inspection tour of plants there. During March in the Pittsburgh district, walkouts caused the loss of 15,000 to 17,000 tons of steel. In six weeks embracing part of February and the first week of April, 30,000 to 35,000 tons of steel were lost in that area. Other disputes interferred with the making of munitions, such as the loss of 700 tons of bomb and shell bodies in a one-day controversy at Aliquippa early this week.

DEMAND for steel remains heavy, with backlogs rising in many lines, including flat rolled products, shell steel, bars, and forgings. One producer reports that first quarter bookings were one-third higher than in the first quarter of last year. The carryover of unrolled tonnage from March into April in the case of most mills probably will prove to be higher than from February into March. WPB has been told by one firm at least that continued issuance of super-directives constitutes a threat to the Controlled Materials Plan.

Steel for rocket projectiles is reported being ordered actively. Production of large Navy shells is scheduled to rise sharply.

Requirements of freight car builders for plates, which are only now being received, may not be turned out until the third quarter instead of the second quarter, due to the combination of heavy Navy and Maritime orders, as well as carryovers. The farm implement program, however, is reported to be on schdule.

To cover the interval before action on the request of Lake Superior iron ore producers for increased prices, OPA on March 30 issued an adjustable price order covering 1944 shipments from Minnesota, Wisconsin and Michigan. The order, issued at the request of the Iron Ore Advisory Committee, provides that prices may be adjusted upward after delivery to an amount not in excess of the ceilings established. The order will be automatically revoked upon the effective date of action taken by OPA, whether it grants or denies the request for higher prices.

FIRST call on the nation's bituminous coal supply during the coal year 1944-45 has been given to the iron and steel industry and certain other war-vital industries requiring special purpose coals mined in the east and midwest. These preferences were embodied in Solid Fuels Administration for War Regulation No. 20, announced on April 1 by Administrator Harold L. Ickes. In addition to giving preference to the iron and steel industry by supplying it with coal to make coke, the regulation includes coal for by-product coke ovens for the recovery of gas or by-products, for foundry or other metallurgical purposes in which the coal or its products of combustion come in direct contact with metal during the processing and for foundry facings requiring special chemical or physical characteristics.

Stocks of bituminous coal held by the steel industry on March 1, 1944, averaged 22 days compared with 29 days on the same date of 1943, while stocks at by-product coke oven declined to 24 days from 39.

In the aggregate, restrictions eased recently by the WPB mount up to a fair-sized total, although individually the actions are not earth-shaking. One move this week increased by about 5 per cent the amount of reinforcing steel which may be used in concrete. There have been actions affecting metal doors, rotary files and burrs, furnace parts, cast iron ware and other utensils, and stoves. A program for $27,000,000 worth of commercial laundry equipment was approved and the making of 50,000 cast iron bathtubs in second quarter was given the green light.

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RESELLERS of iron and steel products such as warehousemen and jobbers, have been granted permission by OPA to use the lowest filed or published rail tariff rate of freight plus 3 per cent of such rate in computing delivered prices.

Other highlights include: Announcement that March aircraft output attained a peak of 9118 planes and the simultaneous revelation by Under-Secretary of the Navy Forrestal that 28,000 combat planes will made for the Navy this year against 13,500 in 1943; intimation by George S. Dively of Cleveland that the government is preparing a "T" type loan for small concerns to supplement "V" and "VT" type loans; statement by WPB that brass mill products are still critical due to the manpower shortage; announcement that the RFC has provided $400,000 additional for steel mill facilities at Daingerfield, Tex.; introduction of a bill in the Senate to put into effect and supplement recommendations of the Baruch-Hancock report; the reported adoption of a new stockpiling policy by the Army, Navy, and Maritime Commission; simplification of Priority Regulation 13 bringing under one document rules governing the sale of idle or excess inventories.

A PROGRAM designed to keep the nation's machine tool producers busy with payrolls benefitting consequently was unfolded at Washington this week by the industry's Advisory Committee. Suggestions included the use of idle capacity for making critically needed components, factory rebuilding of machine tools, and the replacing of obsolete machines with new tools. Meanwhile, it was announced that the value of machine tool shipments continued to decline in February, totaling $50,150,000 that month, a drop of 11 per cent from January.

Other industries in addition to steel are worrying considerably over the manpower question now. Lake shipping interests say young licensed officers are migrating to the draft-free Merchant Marine. In Washington, a House group was told that unless the tool and die industry be given recognition for deferments, mass production cannot help but suffer greatly. Coal miners under 26 were reported to be in line for the draft following a hard-fought battle on the subject in Washington.

Setting an all-time monthly record figures reported by plate producers to WPB, though not officially announced as yet, indicated an output in March of 1,222,585 tons. The previous record was 1,173,164 tons produced in January of this year.

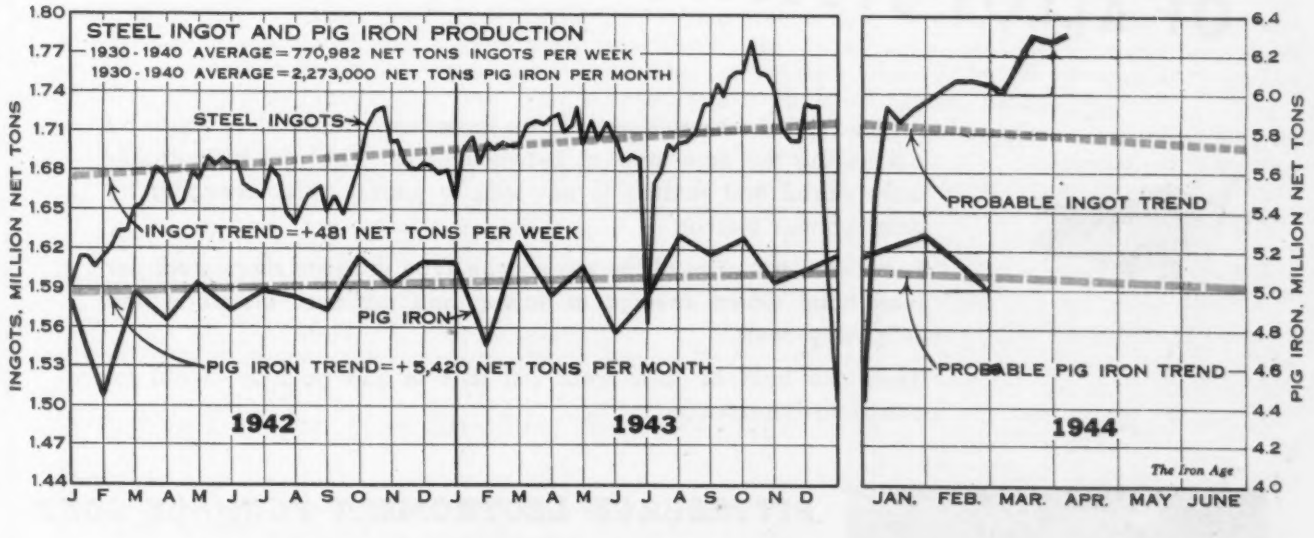
Price Boosts on Four Products Expected

Pittsburgh

• • • After cost studies of carbon steel products, followed by numerous conferences with the Steel Industry Advisory Committee on this subject, it appears that the OPA definitely has conceded, in its own mind at least, that some price adjustments are warranted. These increases, it is understood, have been proved, on the basis of increased raw material, labor, and other costs, which have no bearing upon the wage demands of the steel union, now before the War Labor Board.

Unless a shift in the position of both the industry and OPA occurs within the next few weeks, the government agency is expected to announce upward adjustments on plates, hot rolled bars, hot rolled sheets, 13 gage and heavier, and rails. Most of these items are expected to be adjusted to the extent of $3 a ton, with the possibility that one product may be advanced $4 a ton. Armor plate, and some miscellaneous items which have entered into the war picture, probably will be reduced in price. A logical sequence of any upward adjustment in hot rolled bars would be a subsequent revision in the price of cold finished bars.

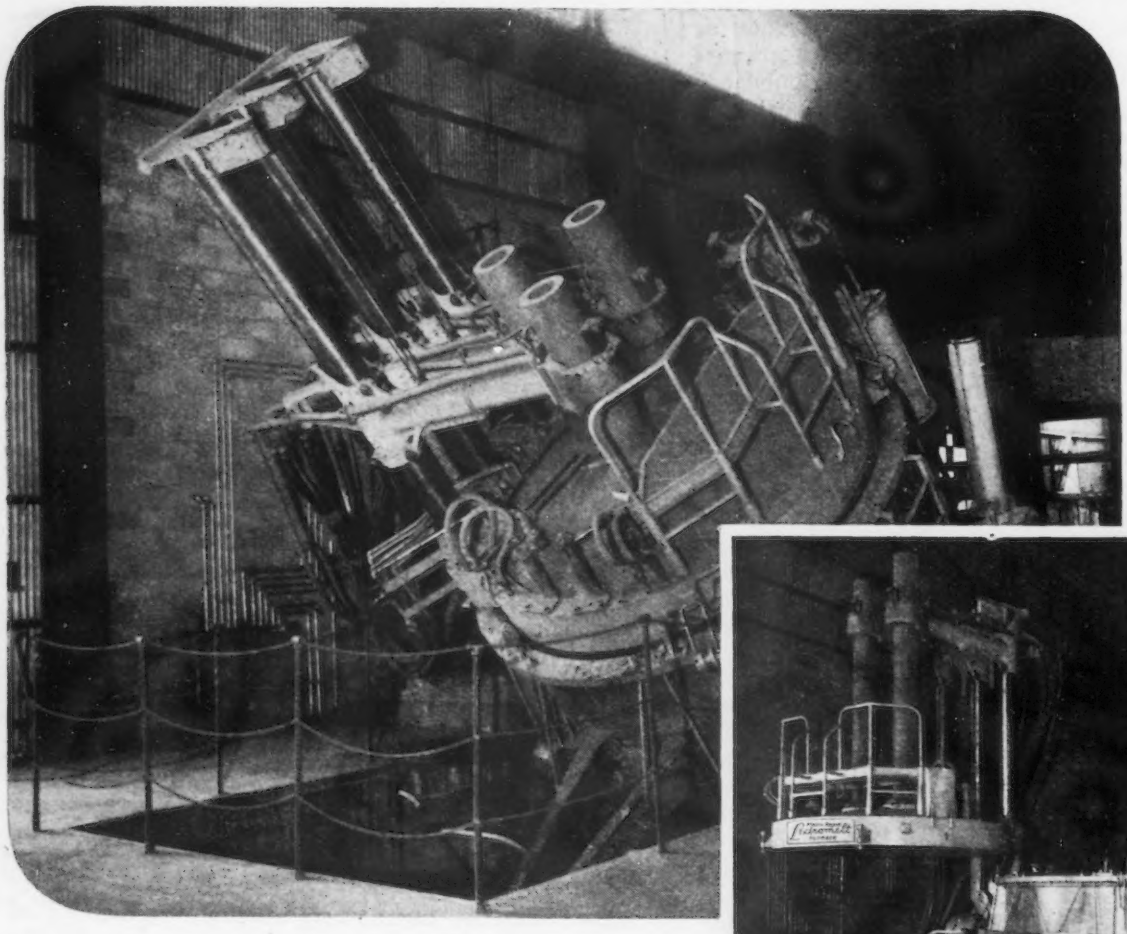
Should increases be granted as expected on plates, bars, hot rolled sheets, and rails, the industry will be receiving relief on those products the return on which has been anything but satisfactory, since the widespread reduction in steel prices was officially announced in June, 1938, thus recognizing various concessions which had been granted previously. This low level of prices for the steel industry was the one used, with minor exceptions, when OPA froze steel quotations a few years ago.

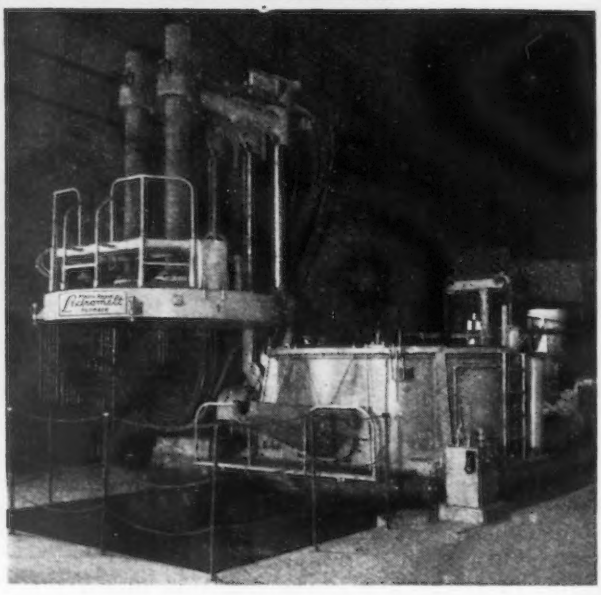


Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
March 30	95.5	101.0	97.5	90.5	102.5	104.5	97.0	99.0	100.5*	87.5	88.0	86.0	90.5	97.0
April 6	96.0	101.5	98.0	91.0	96.0	104.5	98.5	99.0	100.5	90.5	85.0	99.0	93.5	97.5

* Revision





For Speed and Economy

IN THE MELTING OF ALLOY STEELS

Size "OT" Lectromelt top charge furnaces produce steel faster by decreasing the time interval between heats. The roof is hydraulically raised and rotated to one side to permit quick charging by drop bottom bucket.

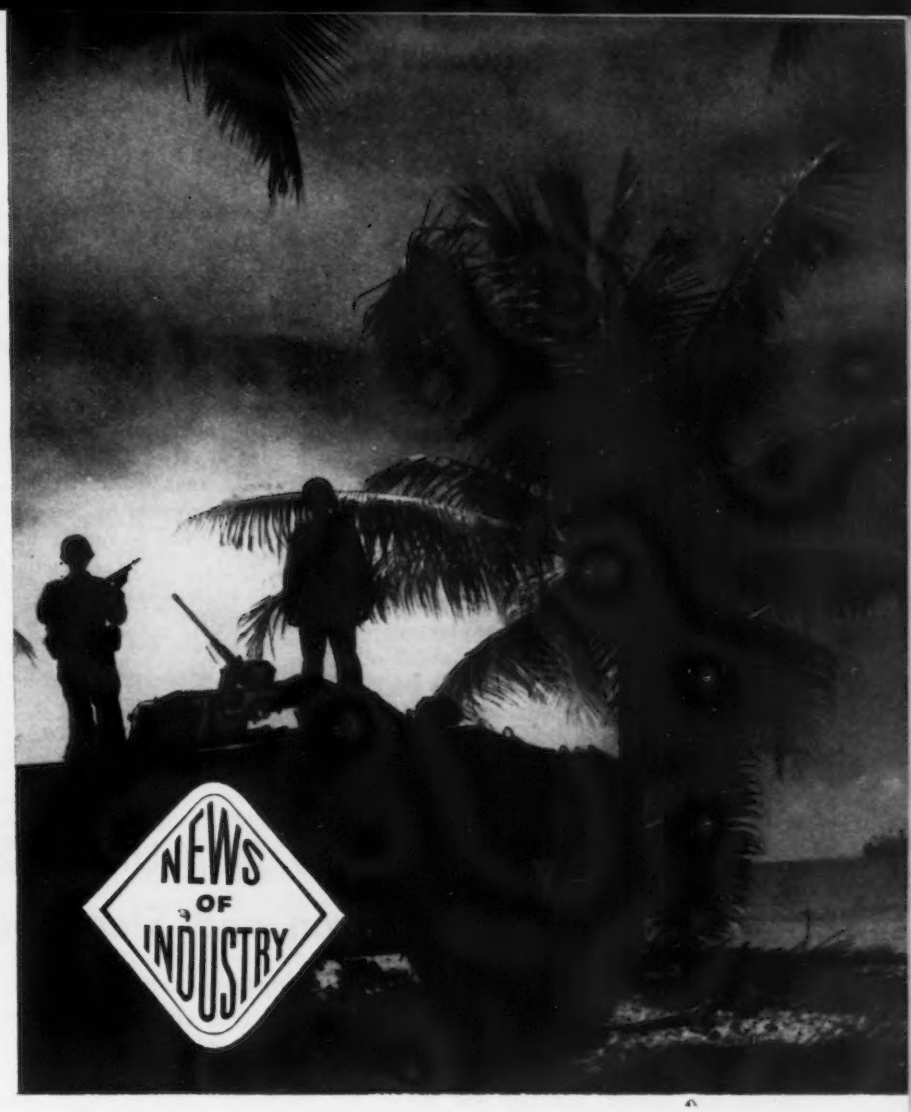
Lectromelt furnaces of the top charge type produce more steel per man hour, afford savings in power, and minimize electrode and refractory costs.

They are built in sizes from 100 tons to 250 pounds. Write for complete information.

MOORE RAPID *Lectromelt* FURNACES

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH, PENNA.

The Furnace of Today and Tomorrow



High Level Output Held in March but Steel Makers Fear Decline Is Coming

Pittsburgh

• • • **Despite** worn out equipment, manpower shortages, and sporadic strikes which lately have been on the increase, some steel producers have succeeded in breaking records, and it is believed, on the basis of advance information, that March steel output, both raw and finished, may well make new records. For some reason, not specifically known to steel men, the months of March and October seem to be those in which records fall rapidly.

Steel production men polled indicate that drastic rulings on the draft problem undoubtedly will affect steel output, but the seriousness of the situation cannot really be determined until the actual problem is faced.

According to opinion here, the greatest single shortage in the manpower picture is common labor. This, in some instances, has slowed up repairs on blast furnaces, open hearths, and rolling mill equipment. To combat this tendency, the unsung heroes in the production picture have cut corners, eliminated what was once thought to be necessary, and, in the past few months, have maintained production despite irritations, strikes, manpower shortage, and what not.

With reference to equipment wearing down, it has been necessary, recently, for some companies to take off strategic operating units, regardless of the loss involved. Because of necessary major repairs, "patch work" no longer satisfies the equipment requirements. In one instance, recently, a mill was forced to shut down its major blooming mill equipment for greatly needed repairs. This caused steel losses in the finishing department, as well as backing up in the open hearth. Another company, a few weeks ago, lost several thousand tons of steel and pig iron, due to an electric power failure, which paralyzed certain production units. No "patch work" could be done here, since permanent repairs had to be made. There have been many instances recently, such as these, which in themselves have not appeared serious, but which, when taken in the aggregate, reflect a loss of substantial steel tonnages.

From the strike angle, although Phil Murray has referred to the union's "no strike" pledge as being a solemn commitment, and as having been lived up to, the actual record of the outlaw strikes has cast some doubt on his statement. This seems to be the case regardless of his argument that the strikes have been caused by the wrong attitude on the part of management.

While public members of the WLB steel wage panel were making an inspection tour here last week, to find out how steel was made, the district suffered an epidemic of flash outlaw strikes, one of which caused a steel loss of about 2500 tons.

During the course of the Jones & Laughlin Steel Corp. walkout, which was started by 90 workers at the company's Pittsburgh Works, but which made 600 steel workers idle for a full day, a company spokesman charged that the walkout seemed "part of a pattern to impress the WLB." The union, on the other hand, accused the company of changing wage rates without submitting the changes to the union for approval. It was explained by the company that new equipment had been installed, which, if the old rates had been maintained, would have resulted in a sub-

British Develop New Steel for Rocket Guns

New York

• • • A "secret type of steel" has been developed by British scientists to withstand the terrific heat generated by the new anti-aircraft rocket guns, it was revealed here last week by British Information Services.

The super-tough metal, which makes possible the firing of the rocket guns, was created by a group of outstanding metallurgists, members of the newly-formed British Iron and Steel Research Association. Composed largely of a group already engaged in war research, the Association will be financed by the Iron and Steel Federation.

stantial increase in pay. The case was before the regional WLB, which warned the men the case would get no consideration while the stoppage continued.

The Crucible Steel Co. of America La Belle Works was tied up for four days last week, due to a wage rate dispute and the dismissal of five men. About 980 persons were involved in the walkout.

Allegheny Ludlum Steel Corp.'s Brackenridge Plant was affected by a four-day strike, involving about 425 workers. For five days last week, close to 600 maintenance employees at the Clairton by-product plant of Carnegie-Illinois Steel Corp., were on strike, threatening retardation in important repairs and maintenance projects. Some coke batteries were cut back for a short time, but little or no production was lost.

A one-day strike at the Union Electric Steel Co. was settled after the flash strike was called "a misunderstanding." The Dravo Corp., making landing craft, had a short strike, involving about 800 men, last week. The American Radiator & Standard Sanitary Mfg. Co. was forced into idleness for a few days last week, when 24 welders struck, making 600 persons idle.

Early this week more than 700 tons of bomb and shell bodies were lost in one day at the J. & L. Aliquippa Works, when employees in one plant struck and demanded removal of the general foreman. According to the company, the general foreman had suggested that an American flag be removed from under a crane runway where it was thought it would become soiled from oil. The men protested and it was put back until another place was to be found.

Following a mix-up involving the passing out of CIO handbills at Weirton, W. Va., last week, when about 25 men were arrested by the Hancock County sheriff, the governor of West Virginia early this week sent state troopers in to handle law enforcement. The proclamation ordered that "No officer . . . should aid or assist either party in any labor trouble or dispute, between employer and employee."

A composite of the manpower and equipment opinion, held by many first class production officials, would be somewhat as follows: The draft regulations will take many key and important employees, thus forcing makeshift arrangements; the increase in the time necessary for repairs will slightly affect the total output of steel; long established methods of doing things must be drastically changed, and novel ideas adopted, if production is not to be seriously affected; major repairs on rolling mill equipment must be made, regardless of the cost, if more serious effects are to be eliminated later; and, finally, because of the knowledge that the Army and the Navy have said their piece, on the question of manpower versus production, there is only one criterion—do the best possible under current conditions.

Few Men Under 26 Will Be Deferred, Iron and Steel Industry Is Warned

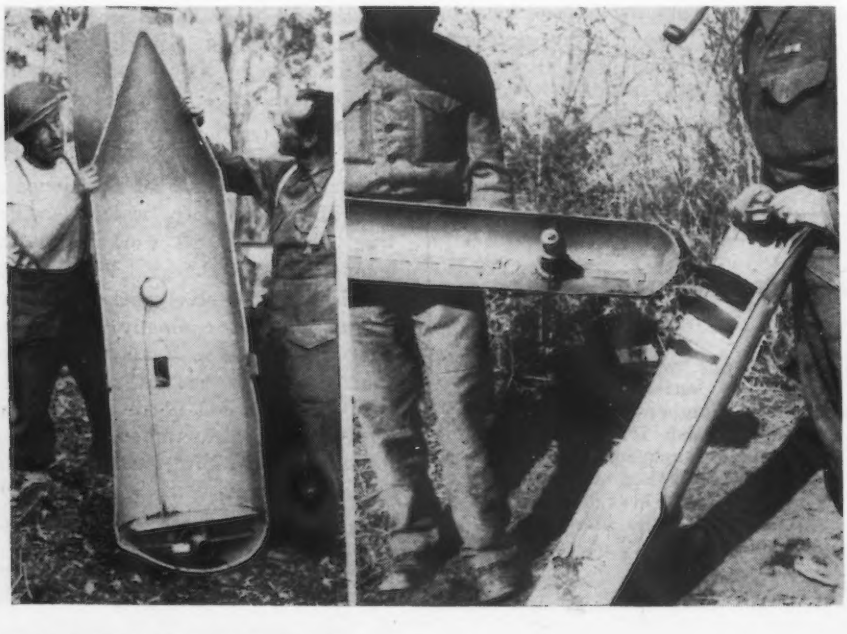
Washington

• • • **The iron and steel** industry can expect very few deferments of men under 26. It was so informed by Arthur H. Bunker, Vice-Chairman for the WPB Metals and Minerals. Announcement to this effect was made by WPB on March 31. The report was conveyed to the Iron and Steel Advisory Committee. It was made clear that the rigid policy of taking men between the ages of 18 and 26 into the armed services applied to all industries.

The announcement grew out of a report the committee presented to WPB Chairman Donald M. Nelson at a meeting at which the problem of manpower and its effect on production was discussed. Suggestions to relieve the problem were made in the report which said that in spite of all efforts the steel industry has been unable to recruit at a rate even approaching separations. It was pointed out that absenteeism and shutdowns already have adversely affected steel production along with losses by reason of the draft and turnover. Concern was expressed by the committee over the future rate of steel production. It explained that steel making is a continuous process and that therefore the breaking of any link would affect the entire chain, while a drop in steel production would affect a great many products made of steel, including military supplies. Nevertheless the committee was told that the armed forces need all available men under 26 and that ways must be found to better utilize remaining manpower.

"The committee approves the immediate formation of local or regional committees consisting of representatives of WPB, WMC, and the procurement agencies to consult with the industries in their districts and, after examination of the facts, to make recommendations to appropriate governmental agencies.

ANTI-PERSONNEL BOMB: *These photos show the cut-away sections of the German anti-personnel or "butterfly" bomb. After falling a predetermined distance from an airplane, the case of the bomb is shot open, releasing a number of small, delayed action bombs. These smaller bombs sometimes do not explode for 24 hours.*



Chicago Area Firms Making Wide Use Of Surplus Stocks to Speed Production

BY CHARLES T. POST
Chicago Editor

Chicago

• • • **Established** distributors, civilian goods manufacturers, and war contractors having emergency requirements generally approve present redistribution procedures, particularly those of WPB, a cross-section survey of Illinois and adjoining states shows.

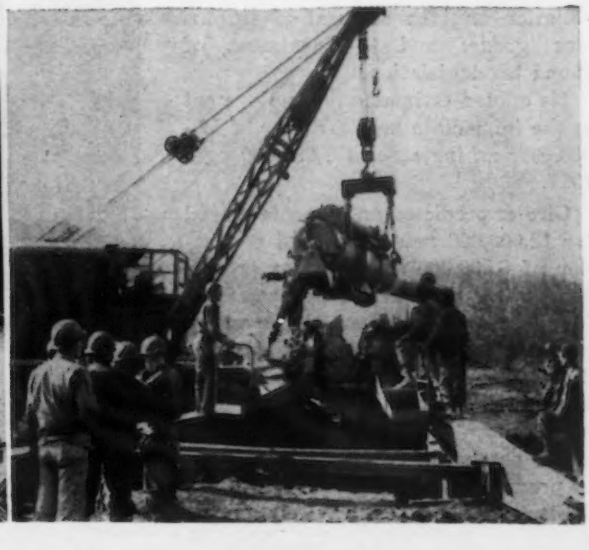
In proportion to the total amount of material handled, purchases of surplus material by steel warehouses and other distributors so far have not been large. Much material is passing direct from war contractors to producers of civilian items whose manufacture is permitted under WPB limitation orders but for which no allotments are made. Producers of military materiel still rate surplus stocks as a first class means of securing critical items in an emergency, although normal sources of supply are relied upon for regular production needs. This situation represents a shift from the early days of the war when lack of advance planning made necessary procurement of day-to-day needs from surplus stocks.

One of the most ambitious "hurry-up" procurement programs drawing on regular trade sources as well as surplus stocks is carried on by the Springfield, Ill., works of Allis-Chalmers Mfg. Co. Around a nucleus of track-type tractor production, this unit produces substantial quantities of war equipment. For the past year, W. V. Kauffman, purchasing agent, has mailed a weekly circular of material requirements to a list comprising 25 or 30 Allis-Chalmers field expeditors, steel and non-ferrous warehouses, WPB redistribution division offices and other government agencies distributing surplus material, industrial plants, and other likely sources. Peak circulation was about 500. Listed are items which are required in smaller-than-mill-production lots, or which mills cannot supply within the required delivery schedule. Machinery is not included. The circular includes requirements of subcontractors of the Springfield works—very often other Allis-Chalmers plants—as well as the Springfield works itself. The name of the plant requiring the material, and its purchasing agent, is noted so that suppliers can make direct contact. In the case of specification material, such as SAE steels, acceptable substitutes are listed. If the required material is not secured one week, it is relisted in the succeeding week's issue. Several thousand tons of material have been secured through this circular, coming from points as far distant as Texas and California. It is admitted that freight charges have raised the cost of material purchased in many cases, but the saving of production time more than offsets this factor.

A large Chicago area brass warehouse frankly states that its ability to serve its customers has been dependent to a large degree upon its enterprise in searching out surplus stocks from which it buys scarce items for its own inventory or particular purchasers' needs. Substantial credit is given to the files of the Chicago WPB redistribution division for this warehouse's ability to purchase two million or three million lb. of copper base material in recent months, particularly in the last 90 days. Restricted by the WPB copper orders in orders upon mills for replacement of inventory, this warehouse is able to replace its stock, without limitation, from surplus materials offerings. Material has been purchased from as far away as the West Coast. These transactions are regarded in the light of customer service, for prices offered sellers have in no case been less than one cent per lb. under regular figures.

A Chicago manufacturer, who in normal times makes conveying and construction equipment, has disposed of approximately 1200 tons of steel in two months through listings with the local WPB redistribution division office at satisfactory prices. Average time required to consummate a sale has been one week, and the federal regulations involved are regarded as reasonable.

BATTLE CRANES: *Heavy duty cranes are much in demand by Allied fighting men for moving heavy equipment. To the left, the crane is being used at a British Naval Air Station in Sierra Leone to handle equipment brought in for repairs. The photo to the right shows the tube and breech mechanism of a 240 mm. howitzer, the U. S. Army's largest, being swung into position. This photo was taken on the Italian front.*



Olds Gives Postwar Business Outlook; Warns Labor on Excessive Wage Demands

• • • **Irvings S. Olds,** speaking March 29 at the annual meeting of the Travelers Aid Society of New York, stressed throughout his entire talk the need for a close relationship and a "better and more cordial understanding between government, industry and labor than has been true in the past," if we are to successfully overcome postwar problems of employment. The chairman of the board of U. S. Steel Corp. told the group that it is not correct to look to, nor place the responsibility on, industry for full employment. "It is equally the responsibility of every group in the country," he said.

"Jobs," he continued, "originate with production—with the setting up of new industries—with the free play of economic laws—with the full opportunity for technological development. The primary effort in the postwar period of all elements in our society must be to encourage such production. This cannot be accomplished by hostility to, or disbelief in, our long-established and thoroughly tried out economic system of free enterprise. Private industry cannot flourish and provide jobs for the many in the face of undue restrictive hampering of its activities at the hands of inexperienced theorists."

Labor must recognize that an industrial concern can pay wages only to the extent that the income from its business will permit, Mr. Olds said.

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Girdler Urges Three-Point Postwar Plan

St. Louis

• • • **Government cooperation** is essential in the task of reconversion, Tom M. Girdler, chairman of Republic Steel Corp., and Consolidated Vultee Aircraft Corp., claimed at a meeting of a postwar sales training group sponsored by the St. Louis Chamber of Commerce on March 31. Calling upon American industry to unite in providing peacetime prosperity, Girdler pointed out the need for the enactment by government of a three-point program. This program incorporates the following: 1—Removal of all unnecessary governmental restrictions when peace comes; 2—Adoption of sound measures for contract cancellation and the disposal of surplus war goods; and 3—Enactment of sound tax legislation.

He quoted estimates of employment in the immediate postwar year of 52,000,000, an increase of 7,000,000 over 1937.

Girdler predicted an immediate need for 12,000,000 new autos and production of 6,500,000 annually for several years after the war. This he said is 50 per cent more than the average output from 1935 to 1939. Regarding the aircraft industry, Girdler said he didn't believe the American people would allow the most potent weapon in our arsenal of defense to return to its prewar status.

Electrical and railway equipment volume is expected to double, building construction to multiply three times.

Earnings Statements

• • • **American Rolling Mill Co.,** reported a net income of $6,098,074 for 1943, compared with $7,780,988 earned in 1942. Higher labor and supply costs together with greater amortization of war facilities charged to operating expenses were factors in the decline in earnings during the past year. Armco reported that at the end of the year, the blast furnace, pipe foundry, plate mill, and some of the rolling mill and processing units at Altos Hornos de Mexico, S.A., were nearing completion. Mexican sources are providing the capital for this project, while the experience and technical facilities are being supplied by Armco.

•

Wickwire Spencer Steel Co., reported total net sales of $24,649,867 during 1943, and a net profit for the year of $1,516,613. Profits compare with those of 1942 which totaled $1,599,004. The company is studying the development of alloy and fine wire products, and such items as insect screen cloth, electrically welded fabric, metal conveyor belts and industrial wire cloth. Tonnage items will be concentrated at the Buffalo plant where steel producing capacity is located.

•

Wheeling Steel Corp., reported a net profit of $4,339,246 for 1943 resulting from a gross sales total of $121,359,532. Of interest in the statement was the report on construction. One of the two proposed electro-tinning lines started in 1942 was completed in April, 1943, and the other was abandoned because of the inability to obtain equipment.

SALVAGE DEPOT: *In an old linen mill at Belfast, Ireland, the U. S. Army has set up a salvaging and reclamation center. All types of Q.M. equipments is reconditioned, and nothing is handled as junk. This system is reported to have saved the government about* $6,000,000 *in* 1943.

Murray Stresses Annual Wage Claim; WLB Will Hear Industry's Side April 16

Washington

• • • **CIO-USWA President** Philip Murray was most enthusiastic in his argument for the guaranteed annual wage in the conclusion of the union's oral presentation before the Steel Panel of WLB on March 29. The steel industry's presentation will be begun on April 18.

Mr. Murray said that as a result of the "carry back" provision of the Federal Tax Laws, American corporations have a "lien" on the Treasury amounting to billions, and intimated that this money should be used to pay for the guaranteed annual wage the union is demanding. Pointing out that the money to be returned to the steel industry after the war is "the people's money," Mr. Murray made a bid in behalf of the union for it and said:

"What will the steel industry do with the $167,000,000 that will be available for their use? Has the steel industry a plan for full employment? None that I know of."

The union has frequently asserted that since the steel industry has no reconversion problems it will not need the money provided for this purpose by Congress to cushion the shock of the return to peacetime production rates. Steel executives say that this is untrue.

The continuous strip mills which have been converted to plate production must be returned to their former condition, and since some companies have assumed fabricating operations during the war, it will be necessary to expend money in many cases to return facilities to their precious jobs. All this will entail monetary outlays industry spokesmen say.

Furthermore, some companies have acquired equipment for wartime operation not required in peacetime business such as hot-topping equipment, cooling beds, runoff tables and shears. While much of this equipment is government-owned, a great deal was purchased by the companies and represents substantial losses because of normal-business inutility and no great market exists for it because of general over-expansion of the industry.

The union brief practically demands that the steel industry be taken over by the government.

Rail Production This Year May Be Heaviest Since 1930

Pittsburgh

• • • **With railroads** slated to get more than 2,000,000 tons of rails this year, rail production probably will be the heaviest since about 1930. Practically all of the rails to be made this year, and those made in the past few years, have been for replacement and maintenance. In former years, large tonnages were for new trackage.

An analysis of production for sale of rails 60 lb. or heavier, since 1939, shows 1943 production was 66 per cent greater than in 1939. Despite heavy war requirements in the past few years, the flow of rails from the mills to the roads has been at an accelerated rate. Because export statistics are not available, due to censorship, it may be that the increase in rail production did not accrue entirely to domestic railroads.

Trend in Standard Rail and Track Accessories, Production For Sale

Source—American Iron & Steel Institute
Compilation—The Iron Age
Net Tons (000 Omitted)

Year	Standard Rails*	Splice Bars & Tie Plates
1939	1162	466
1940	1487	481
1941	1708	676
1942	1941	682
1943	1934	629
Increase 1943 over 1939	Plus 66%	Plus 35%

* 60 lb. and heavier.

A substantial increase in the production of splice bars and tie plates was also recorded for 1939 to 1943. Production in the latter year was about 35 per cent greater than in 1939. Production of these items in 1944 is expected to follow somewhat the same relationship between standard rails as was the case last year.

The subject of rails has come forward recently, not only from the standpoint of railroad requirements, but because this item is said to be one on which the steel industry makes the least return, and on which some companies are said to be losing money. If and when the OPA makes upward adjustments in steel prices, it is believed that some revision in the rail price will be one definite fact in the total picture. Several years ago standard rails were reduced from $43 to $40 a ton, f.o.b. mill, during a steel price—political phase on the part of the administration.

M-8, ARMORED CAR: *Designed to combine the speed and maneuverability of an automobile with the punch and armored protection of a light tank, this armored car, the M-8, is the latest U. S. Army combate vehicle. It weighs 8 tons; mounts a 37 mm. cannon and a .30 cal. machine gun; and carries a crew of four at high speeds over practically any terrain.*

Check List FOR READJUSTMENT

Timing, Speedy Action And Bold Planning Are Emphasized in Suggestions Which Should Be Studied Now

• • • The Massachusetts Committee on Post-War Readjustment, 15 Ashburton Place, Boston 8, appointed by Gov. Saltonstall, has issued its third report, a 24-page bulletin titled "War Adjustment Now." In addition to the section abstracted below, covering steps which businessmen can take now, the bulletin contains a chapter on characteristics of the war adjustment period, a section on assistance business needs from the Federal government, and other data.

What Can Be Done By Businessmen

If you feel some of your contracts might be cancelled or cutback—

1. Begin looking for other prime or subcontracts on war goods, or goods intended for rehabilitation of occupied areas. Keep in touch with procurement officers, FEA, UNRRA, WPB, SWPC, your trade association, etc.

2. Prepare to do your part in facilitating settlement of cancelled contracts by

a. Designating a department or individual to keep posted on proper procedures. If you run a "one-man business" take time to do it yourself. If possible, arrange for adequate engineering, accounting, and other professional assistance.

b. Arranging to have the most recent or most advantageous type of cancellation clauses included in your contracts.

c. Reviewing your contracts to see whether you are able to give the information (especially accounting and inventory) which you agreed to give in event of cancellation.

d. Taking a properly classified inventory of all materials, tools, equipment and parts which you have acquired for use in connection with war contracts. Determine the cost of all, decide which if any you wish to keep and what you are willing to pay for them.

e. Keeping posted on current changes in regulations, manuals, and legislation. Some of the services are conducting contract termination schools which contractors may attend.

f. Taking any specific steps that appear necessary to make sure that you are ready for prompt action. This might include real commitments calling for expenditures now which could be considered in the nature of insurance; for example, you might:

(1) Rent warehouse space for storage of war equipment and supplies to get them out of your way quickly.

(2) Make binding commitments such as VT loan agreements with financial organizations for assistance if your settlements are delayed.

g. Exerting pressure on all your subcontractors to see that they are as adequately prepared as you.

If one or more of your contracts are actually cancelled:

1. File your claims promptly.

a. Some services hold preliminary meetings with a contractor whose contract has been cancelled in order to work out exact procedures for filing claims.

b. Help subcontractors to get their claims ready.

2. Take accurate physical inventories promptly and maintain adequate records. As the basis for government instructions for disposal of inventory and for dollar claims against the government, accurate inventory records, well supported by evidence, are most important.

Speed of settlement, as well as fairness in the amount of settlement, will be affected if the contractor is not prepared to submit proper records of his inventory as of the date of termination.

3. Approve proper subcontract claims promptly.

4. Do not pad accounts in order to provide a cushion for bargaining.

5. Submit partial claims. The services usually can accept, approve, and pay claims for any portion of the total claim, as soon as the partial claim is presented with proper evidence. Adjustments in the claim may be made at any time up to the final settlement.

If you have subcontracts or sub-subcontracts:

A. Most of the advice to prime contractors applies to greater or less degree but

B. In addition see that your arrangements with the prime contractor are understood and that you are prepared to fulfill your part.

C. Consider the advisability of obtaining professional services, such as those of lawyers, accountants, and engineers, to advise you in protecting your rights. This suggestion is especially applicable to smaller companies which may not normally need such services and for whom war contracts are unusually complicated.

D. If one of your subcontracts is cancelled:

1. Prepare your claims promptly in cooperation with the prime contractor.

2. Even if the prime contractor does not have his claim prepared for filing, get him to approve yours as quickly as possible. The contracting officer usully can make payment for the account of any subcontractor whose claim is approved even before the claim of the prime contractor or of other subcontractors is presented.

3. If you do not receive cooperation or what you think is fair treatment from your prime contractor see whether the contracting officer is able to assist you.

Whether or not you have any war contracts; no matter what you are doing now, consider:

A. General planning procedure.

1. Have an immediate working plan for use in the event of sudden changes. Know what you are going to do tomorrow morning if news comes that Germany has started to crack.

2. Place on an individual or on a group definite responsibility for conversion. If you run a "one-man business," find time to do it yourself.

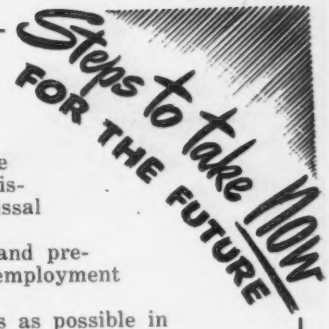
3. Subdivide the job into definite projects, such as programs for deferred factory maintenance, for rearranging equipment. Set deadlines when such plans must be completed.

4. Find your most important problems of conversion. Look for them in the following major divisions of your business: **(a.)** Production; **(b.)** Personnel; **(c.)** Marketing; **(d.)** Finance; **(e.)** Purchasing; **(f.)** Accounting and other management controls; **(g.)** Research.

5. Try to foresee the probable bottlenecks in your particular switchback problems (lack of materials, difficulty in obtaining needed equipment, delay in contract termination, too little working capital).

6. Once you have found the problems in your business do something about them yourself.

Get outside help if necessary, but don't count on the government to be of positive constructive assistance. Be prepared for the worst so far as government delay and control are concerned, but don't let your apprehension delay action on your part.



B. Production conversion.

1. Product plans.

a. Nearby product plans.

(1) Prepare to make products which can be placed quickly on the market (1942 models, Victory models, or stop-gap products.

(2) Keep closely in touch with OCR, WPB, and SWPC and your trade association in order to know at all times what civilian products may be manufactured and what materials may be obtained.

(3) Consider new lines of business to absorb any excess plant capacity but develop new products which will create new markets, rather than merely displace other products.

b. Longer run product plans.

(1) Plan the development of new and improved products for introduction after the initial conversion period is past.

(2) Consider possibilities of new or cheaper materials developed during the war.

(3) Check the use of alien patents; some 50,000 enemy patents are available to American business; see WPB, Alien Property Custodian, SWPC, or your trade association. (Ed. Note—IRON AGE has printed many of the seized patents of interest to the metal working industry.)

2. Plant conversion.

a. Prepare a step-by-step program for physical conversion. Know which machine to move first; where it goes; what new machines will be needed and so on.

b. In preparing such a program you might:

(1) Determine what equipment now used on war production can be used for civilian production.

(2) Check condition of equipment in storage.

(3) Determine what new equipment is needed and make plans to acquire it. Consider government surplus as a source of new equipment.

(4) Plan how to move and store government materials and equipment in order to speed conversion.

(5) Prepare blueprints of new factory layouts.

C. Personnel conversion.

1. Industrial demobilization. Be prepared to face such problems as: **(a.)** Selecting workers for dismissal; **(b.)** Notifying them; **(c.)** Actual termination; **(d.)** Dismissal wages; **(e.)** Maintaining and retaining a balanced work force.

2. Building a work force.

a. Determine the kind of workers required, the kind of workers immediately available, and available through training.

b. Take a personnel inventory to determine what workers will

(1) wish to drop out of your work force voluntarily at the end of the war; move elsewhere; return to homes; resume schooling, etc., (2) desire, if possible, to remain in your employ.

c. Study employment records, try to find out the number of your former workers now in the armed services who will wish to return to your employ and in what departments. Give attention to their seniority.

d. Learn what you can about the training and the duties of former employees now in the armed services. Be prepared, so far as possible, to offer your former employees jobs which will use their new or higher skills.

e. Make estimates of personnel requirements at each of the several stages in the war adjustment period.

f. Make plans as to what you will do with the key people who may not be required.

g. Make plans for any necessary employee retraining.

h. Develop a program for effective recruiting of new employees from the ranks of returned servicemen, utilizing so far as possible any special skills which they have acquired.

i. To whatever extent necessary, be prepared to develop retraining programs for returning servicemen.

j. Large companies, especially should probably recognize that they may be called upon to give employment to disabled veterans who may need entirely different kind of jobs from those now offered.

k. Give consideration to some of the special problems of dismissal, most notably, dismissal wages.

l. Reappraise your policies and prejudices with respect to the employment of women.

m. Take all the steps so fas as possible in cooperation with labor organizations.

D. Marketing conversion.

1. Make marketing plans both on a nearby and a longer run basis.

2. Get out now to see your former customers. Find out what they are doing and what plans they are making for conversion. Get estimates of their probable requirements. Tell them your plans.

3. Use data from your trade association, Department of Commerce, CED, OCR, and SWPC in an endeavor to estimate potential size of your nearby and longer run markets.

4. Define your sales personnel requirements and see whether any wartime training or experience either inside or outside your own company, and especially in the armed services, is developing people for your organization.

5. As rapidly as manpower conditions permit, rebuild your sales organization with a view to getting salesmen on the road in the shortest possible time.

6. Make plans now for advertising and other sales promotion efforts; prepare catalogues, arrange specific advertising campaigns and the like.

7. Plan now and take steps to put the plans into effect for rebuilding your distribution and dealer organization; make commitments for branch distribution centers; make contacts for new or changing distributors and agents; and decide what your distribution should be like in the light of future requirements.

8. Determine price policies now both for the nearby conversion period and for the longer run. Price policies will be of especial importance in the early period of adjustment, while old or stop-gap models are being offered. Prices, especially on durable goods, should not be such as to cause postponement of purchase.

E. Financial conversion.

1. Make financial plans now, particularly for the nearby conversion.

a. Estimate as closely as possible your probable cash position at time of contract termination.

b. Make a cash budget for your reconversion period, considering such factors as probable size of contract termination payments, possible delay in those payments, amounts realizable from inventory liquidation, collections on accounts receivable, cash available from depreciation and amortization; and on the other side, income and excess profits tax liabilities, outlays for severance wages and regular payroll, settlement payments to subcontractors, necessary outlays for materials, payments to trade creditors, bond interest, notes payable, possible payments on account of renegotiation, possible requirements of your customers for financing.

c. If this budget shows that you are going to need working capital arrange now to make sure you'll get it. For example, consult your banker, your contracting officer, local officers of the RFC, FRB and SWPC; investigate VT credits.

2. Make longer run financial plans for the future.

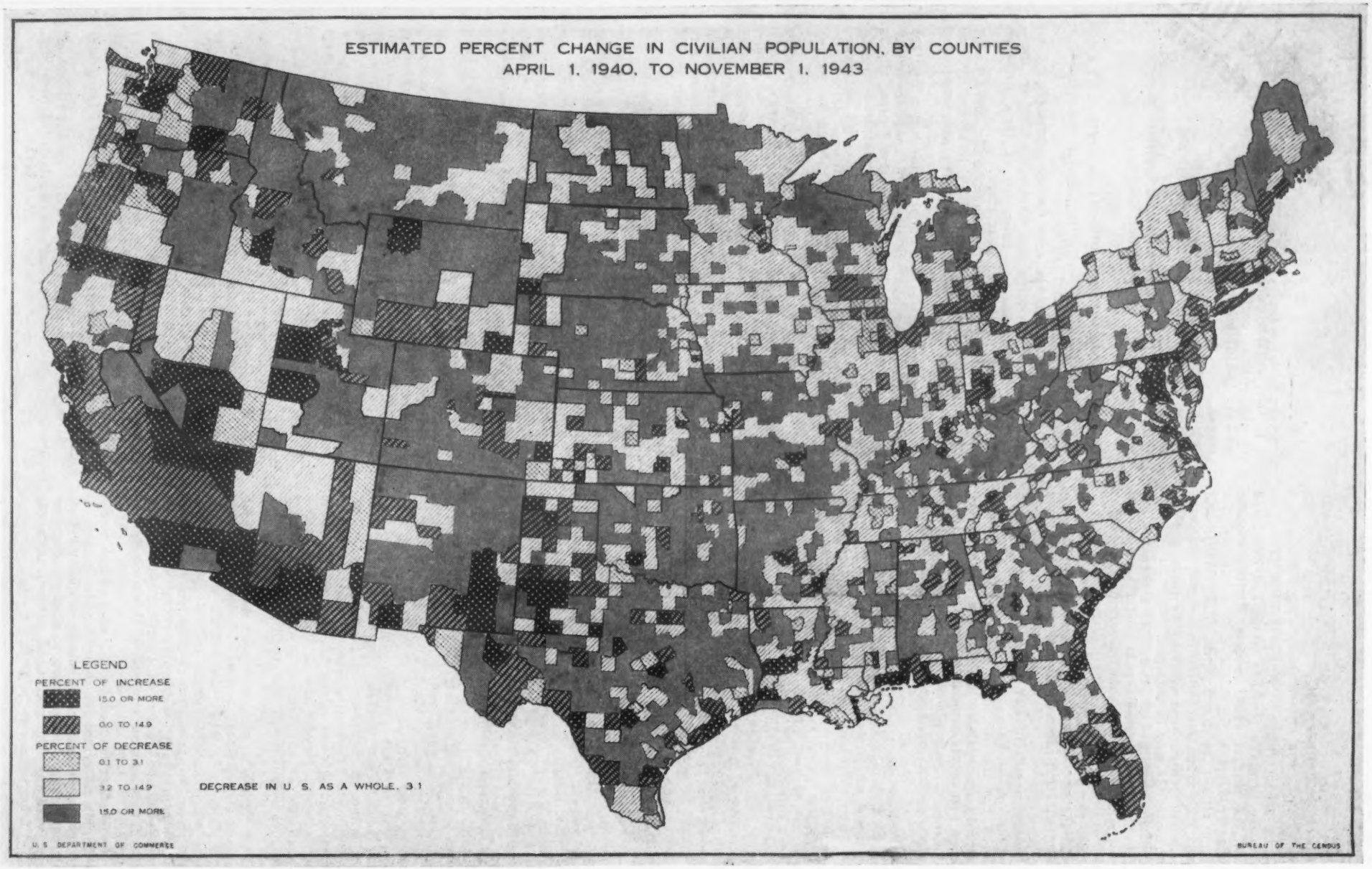
a. Estimate capital requirements for the period after conversion.

b. Determine the most feasible method of providing this capital.

c. Determine most advantageous time to obtain capital.

3. Don't be bound too much by past patterns of financing; investigate wartime methods of financing.

(CONTINUED ON PAGE 144)


ESTIMATED PERCENT CHANGE IN CIVILIAN POPULATION, BY COUNTIES
APRIL 1, 1940, TO NOVEMBER 1, 1943
LEGEND
PERCENT OF INCREASE
15.0 OR MORE
0.0 TO 14.9
PERCENT OF DECREASE
0.1 TO 3.1
3.2 TO 14.9
15.0 OR MORE
DECREASE IN U. S. AS A WHOLE, 3.1
U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

EFFECT OF MIGRATIONS, INDUCTIONS SHOWN: *Since the* 1940 *census* 2,620 *counties of the nation have shown a decrease in population, nearly half of them being losses of* 15 *per cent; while* 469 *counties have increased their civilian population. These estimates by the Bureau of the Census are based on registrations for War Ration Book Four. Conclusions were published in Release No.* 3 *of Series P-44.*

By-Passing Antagonisms, Prejudices Success Secret of Conciliation Service

By DR. JOHN R. STEELMAN
Director, Conciliation Service, U. S. Department of Labor

DR. JOHN R. STEELMAN

• • • **Total war** has yielded two by-products that profoundly affect industrial relations here in America. The first is a patriotic impulse toward greater unity which has given management and labor a better grasp of their common problems and purposes in the war effort. We see the results of this mutual understanding in tremendous production totals and in the success of joint labor-management committees.

The second by-product, however, has created an atmosphere of strain, tension, and conflict that makes the settlement of industrial disputes much more difficult. In this wartime environment minor disagreements often flare up into serious controversies.

Both of these factors influence the present work of the U. S. Conciliation Service. Experience has shown that industrial peace and harmonious labor relations are most successfully achieved by voluntary methods. The Service operates in a voluntary way without any arbitrary powers—it uses neither compulsion nor force.

Yet during the past calendar year, the Conciliation Service disposed of 21,775 situations involving more than 11 million workers. These cases ranged from strikes, lockouts, and threatened stoppages to sundry disputes. The prime purpose of the Service is to help management-labor disputants with advice and counsel based upon experience gained in similar negotiations over a wide field of industry and commerce. The conciliator's role is strictly impartial. His job is to steer the negotiations into channels where the parties can mutually work out their problems.

Both management and employee representatives call on the Conciliation Service when negotiations reach an impasse. They may write, wire or telephone such requests to Washington or to any of the five regional directors:

H. Ross Colwell, Parcel Post Building, 341 Ninth Avenue, New York 1.
Ewing R. McDonald, 222 Adams Street, Chicago.
E. A. Marsh, Phelan Building, San Francisco.
Howard T. Colvin, Washington 25, D. C.
Edward J. Cunningham, Washington 25, D. C.

It is significant that the proportion of requests from employers is steadily increasing.

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The Conciliation Service maintains a staff of approximately 300 commissioners of conciliation stationed at strategic centers throughout the nation. In addition to the regional headquarters there are also a limited number of field offices located in each of the regional districts. When a request for a conciliator is made, the director or the regional director involved, assigns a particular commissioner to the case.

The majority of disputes handled by the Service are touched off by issues that involve pay rates, including hours of work and vacations. This item comes up in about 70 per cent of the cases with which conciliators deal.

The usual course of a conciliation case centers around the conference table, where representatives of both sides discuss their problems in the presence of a friendly, neutral peacemaker. Simple as it sounds, this method solves the vast majority of disputes. And there is a very good reason why such joint meetings are so successful—most labor-management disputes that reach the Conciliation Service have their roots in personal antagonisms and unspoken prejudices which prevent frank, open discussion of other issues. It is the conciliator's job to syphon off or by-pass these hidden animosities and create an atmosphere of mutual trust between the contending parties.

This role is not easy. Often it requires infinite tact and the sound judgment born of long experience. Commissioners are very carefully chosen, though they come from many walks of life.

During the past calendar year the Conciliation Service handled 3,119 situations in the iron and steel industry. This total included 2,696 active disputes involving 1,307,529 employees. In the seven months from July 1, 1943 to February 1, 1944 there were 253 strikes reported to the Service. These walkouts involved 135,933 employees. In this same period it was necessary to certify 346 cases, covering 419,695 workers, to the National War Labor Board.

While most disputes are settled around the conference table, the Conciliation Service also has a staff of commissioners with technical training who are equipped to make studies and findings of fact upon the joint request of the parties. Again, this is a voluntary procedure with the findings offered to both parties as a basis for further bargaining. The type of technical assistance given depends upon the questions involved. If the problem involves work load, a time study may be made or the incentive plan reviewed. Various other problems may require technical assistance in preparing job descriptions to be used as the basis of classifying employees or in helping the parties with a job evaluation project. Last year the Technical Division extended its work into a total of 35 industries. While commissioners often suggest such aid, employers or employees may request it by writing to the Washington office.

Where none of these methods provides a solution, conciliators may suggest arbitration. The Service has a staff of commissioners with specific arbitration training who hear cases and make awards when jointly requested by the parties. Here too, the action must be voluntary, with both sides agreeing to accept the decision of the arbitrator. In some cases the parties ask for an outside arbitrator to be appointed by the Director of the Conciliation Service.

Last year the Service appointed arbitrators in 1115 cases. Their impartial awards were almost all well received by both management and labor.

EFFECT OF MIGRATIONS, INDUCTIONS SHOWN: Since the 1940 census 2,620 counties of the nation have shown a decrease in population, nearly half of them being losses of 15 per cent; while 469 counties have increased their civilian population. These estimates by the Bureau of the Census are based on registrations for War Ration Book Four. Conclusions were published in Release No. 3 of Series P-44.

and the wage awards, with only a few exceptions, were unanimously approved by the respective Regional War Labor Boards. During this war period, new wage agreements generally are subject to review and approval by the National War Labor Board.

Even this very brief summary of the Conciliation Service should stress again the basic importance of the human angle in labor-management relations. Economic issues do provoke many disputes and sharp differences of opinion, but these points are less troublesome than long-held prejudice and emotional bias.

"No Claim" Frequently Results In War Department Terminations

Cleveland

• • Study of 9502 contracts ended by the War Department up until Sept. 30, 1943, shows that about three-quarters of the terminations brought no financial claims whatever. Actual cash settlement totaled about three-quarters of the claim value on the terminated contracts and sub-contractors received less than one-fifth of the settlement money paid on the cases in the study in which both prime and sub-contractors were involved. Partial payments in settlement of termination claims constitute less than one-tenth of the total amount of the claims and in this sub-contractors shared to the amount of 11 per cent in receiving these partial payments.

The relative ease of disposal for both raw material and components under present conditions has been such as to cause "no-claim" terminations to be much higher than can be expected after the war when markets for both raw materials and components are expected to be uninviting. Contract terminations at least up until Sept. 30, 1943, were leading settlements by more than 30 per cent in rapidity of occurrence and promise to pile up a backlog of pending settlements.

The statistics do not include any terminations by default of the contractor or for production facilities alone, but do include some terminations of both production supply contracts and facilities contracts where they were integral.

The report covered 9502 contracts totaling about $5,600,000,000, but included 1186 terminations on which the value could not be estimated accurately. The actual total is believed to be more nearly $6,500,000,000.

The percentage of settlements runs highly in favor of the smaller claims. Slightly more than 63 per cent of the $1000 to $10,000 claims have been settled, while only about 32 per cent of the larger claims were recorded as settled. One-half of the $1000 to $10,000 claims were settled in three months or less, yet at least one-sixth of all claims require seven months or more for settlement. Only one-fifth of the claims over $100,000 has been settled in three months or less and over one-half of these required seven months or more. In pending cases about one-tenth of the $1000 to $10,000 group is represented and more than one-half of the over $100,000 group as pending for seven months or more. However, average settlement of claim has come in 4½ months for the 1148 cases settled and it is indicated that at least one-half of this time consumed was used in filing claims.

Status of Claims Reported by War Dept. Sept. 30, 1943

	Number	Per Cent	Value
Total Termination Claims	9502		
Claim Value Unavailable	1827		
Claims Reported	7675	100.00	
No Financial Claim Made	5538	72.2	
Claims of $1000 or more	2136	27.8	$231,086,000
Claims Settled	1148	14.9	51,824,000
Claims Pending Settlement	988	12.9	179,262,000

Claim Distribution

	Number	Per Cent	Settled	Pending
Total Claims	2136	100.00	53.7	46.3
$1000—$10,000	1065	49.9	63.5	36.5
$10,000—$50,000	582	27.2	52.9	47.1
$50,000—$100,000	192	9.0	35.4	64.6
Over $100,000	297	13.9	32.3	67.7

Time Status

	Settled			Pending		
	3 Months or Less	4—6 Months	7 Months or More	3 Months or Less	4—6 Months	7 Months or More
Total Claims	42.4	28.6	29.0	46.1	27.7	26.2
$1000—$10,000	55.4	27.3	17.3	66.4	22.6	11.0
$10,000—$50,000	25.4	31.1	43.5	43.5	32.8	23.6
$50,000—$100,000	25.4	31.3	43.3	24.2	31.7	44.2
Over $100,000	17.9	27.4	54.7	24.0	28.0	48.0

Distribution By Size

Size	Claim Value	Settlement	
		Amount	% of Claim
Total Claims	$51,824,000	$39,351,000	75.8
$1000—$10,000	1,488,000	1,214,000	81.6
$10,000—$50,000	7,733,000	5,921,000	76.6
$50,000—$100,000	4,831,000	3,472,000	71.9
Over $100,000	37,772,000	28,744,000	76.1

Sub-Contractor's Claims

	% of Total	Per Cent Share in Claim Value	
		Settled	Pending
Total Claims	17.6	12.0	20.7
$1000—$10,000	7.4	8.9	4.8
$10,000—$50,000	10.8	11.4	9.9
$50,000—$100,000	16.4	15.6	17.0
Over $100,000	18.8	11.7	22.1

Heavy Postwar Demand for Zinc in Galvanizing and Diecasting Held Likely

• • • **Zinc** is no exception among materials which face pretty rugged competition for use in this country in the postwar years. However, considerably too much stress has been placed on the current price of zinc, as compared to proposed cuts in aluminum and magnesium prices. A study of zinc prices over the past decade or two will show those prices have been below current quotations. The zinc industry with its open market quotations for price, as against set prices such as those established for aluminum by the Aluminum Co. of America, had already for two years felt the effects of increasing demands and increasing costs for this metal when, in 1941, price ceilings were established.

During the 10 years up to the establishment of the 8.25c. per lb. price ceiling in 1941, Prime Western slab zinc quotations averaged 5.04c. per lb., East St. Louis. The high during this period was 8.25c., the price ceiling, while the low was 2.30c. per lb. This low, set in 1932 when the depression was at its worst, is not too indicative of prices. Neither should the average of 5.04c. per lb. for the 10-year period be taken too literally as a guide for the future, in view of today's higher production costs. It is of interest, however, to note that—based on a 20-year period from 1923 to 1942 inclusive—zinc quotations averaged 5.68c. per lb., East St. Louis. This period included the boom 1920's as well as the depression years during the '30's.

Much of the output of the zinc industry is dependent upon the steel industry for use, because zinc for galvanizing has consistently been the greatest single outlet for this metal in peacetime. However, another use for zinc grew by leaps and bounds during the 10 years preceding this war—that of die casting. From the standpoint of these two major uses of zinc, it might be well to examine their postwar potentialities, whether or not this would alter the price outlook, and what might be substituted for zinc in their manufacture.

Aiming at a substitute for zinc in the protection of steel against the corrosive action of weather, there have been experiments in coating steel with aluminum. But, there is little long-range use data available, and there are difficulties, both technically and economically, to be overcome in the application of this type of coating.

Recently, when so much of the slab zinc production was taken for shell brass, there was renewed interest in the possibilities of lead-coated steel sheets, but people have known of lead coatings for many years and, under prewar conditions, they have had little consumer acceptance. In the opinion of a number of experts, neither aluminum nor lead seems to offer to iron or steel the extremely valuable characteristic of electrochemical protection provided by zinc.

Steel producers are quite optimistic about the postwar markets for galvanized steel. To begin with, the WPB curtailed drastically the domestic use of galvanized steel, channeling the reduced production almost wholly into military channels. Consequently, very little has been available for replacement throughout the country. Galvanized roofing and siding, pipe and gutters, culverts, fences, and storage tanks of many types—for industry, railroads, utilities, farms and homes—are a few of the galvanized steel products that will be in demand for both replacement and for new construction.

Galvanized Steel Output

	Galvanized Steel Production net tons	Total Steel Production net tons	Galvanized Steel Production per cent
1931 ...	1,669,639	28,606,379	5.8
1932 ...	1,007,445	15,123,207	6.7
1933 ...	1,414,982	25,724,196	5.5
1934 ...	1,468,193	29,181,329	5.0
1935 ...	1,920,142	38,182,986	5.0
1936 ...	2,386,439	53,499,085	4.5
1937 ...	2,511,915	56,635,899	4.4
1938 ...	1,943,221	31,751,983	6.1
1939 ...	2,783,924	52,797,783	5.3
1940 ...	2,965,184	66,981,662	4.4
1941 ...	3,116,948	82,927,557	3.8
1942 ...	1,918,084	86,029,921	2.2

Galvanized steel production followed closely the total steel production in this country until the beginning of the war, as shown in the accompanying table. In 1940, galvanized output dropped sharply, while steel production started to pyramid. There is no reason to doubt that, as soon as production controls are removed from steel, galvanized steel output will again follow the trends of total steel production. Such being the case, it is well to examine the predictions of authorities on what steel production will be after the war. Walter S. Tower, president of the American Iron and Steel Institute, before the Institute of Scrap Iron and Steel at Cleveland on Jan. 12, 1944, stated that some semi-official calculations figure demand for steel in the early years after the war will be as high as 120,000,000 tons of steel ingots, or about 85,000,000 tons in terms of finished products. He personally was more conservative in his estimate of steel needs, placing postwar needs at between 45,000,000 and 50,000,000 tons of finished products, or 67,000,000 to 70,000,000 tons of ingots per year. This latter estimate would place the galvanized steel production in the neighborhood of 3,500,000 to 4,000,000 tons if it resumes the same position to steel production as it maintained prior to the war. However, with the pent up demand believed to be so high, the production of galvanized steel might even take a larger cut of steel ingot production.

Another factor that may increase the production of galvanized steel products is the development that will take place in electro-galvanizing. While any prediction of such developments is largely speculative, it seems safe to say that such refinements will be in the direction of applying, at lower cost, an adherent and ductile protective coating of zinc where it is not now economical, and of making it feasible to coat with zinc where hot galvanizing is not applicable. The advance which electro-galvanizing has made in the direction of ductile and adherent coatings already has stimulated further developments of hot dip coatings to permit the further fabrication of zinc coated sheet. The main point is that the types and numbers of galvanized surfaces will be increased.

The question of how much zinc will be used in die castings must be evaluated on an entirely different basis. Zinc alloy die castings have been proved satisfactory but, on the other hand, so have die castings made of other metals. Of the six basic types, four can be regarded as specialties. Tin and lead die castings have a small and well defined market. Neither magnesium nor brass die castings are used in quantities comparable to zinc, or even to aluminum. Magnesium is used where extreme lightness is the main requirement. Brass is used where the highest possible

strength is the chief consideration. And there are a great many other die casting applications where very considerable strength is required, so that zinc alloy die castings are standard, with price a secondary factor.

But there also are a great number of places where the physical requirements are not so well defined, and where either zinc or aluminum die castings could be used. Here, price will be a major consideration in determining the metal for die casting. Pricewise, zinc has competed with aluminum for use as die casting material, this being indicated by the fact that zinc consumed for die casting in 1932 totaled only 17,000 tons whereas, in 1941, a total of 125,000 tons went into die casting. Aluminum for die casting underwent a similar increase, but in the last prewar year zinc for die casting outsold aluminum three or four to one. And this in spite of the fact that the price-volume relationship favored aluminum.

In many cases, however, users of die castings were able to obtain the finished zinc alloy die castings at a lower quotation than aluminum because of numerous advantages inherent in the casting and finishing of zinc alloys. Briefly, the use of zinc means longer die life because of lower casting temperature, more castings per hour because of better casting characteristics, lower machining costs because of the possibilities of more complex zinc castings and their better machining properties, and lower finishing costs.

To guess where prices will stabilize in the competition among primary or secondary metals is rather difficult. While prime aluminum prices were and are governed pretty much by the Aluminum Co. of America, prices of secondary aluminum — the base for perhaps half the aluminum die castings—vary because of general market conditions. The price of secondary aluminum will be influenced, of course, by the price of virgin aluminum, which is at its lowest point in history. Only government aid has made it possible for practically all aluminum producers, with the exception of the Aluminum Co. of America, to market aluminum at current prices.

And what does this all add up to? It seems logical to expect a good market for zinc in galvanizing. This should offset rather slow demand from the brass manufacturers while war brass is being worked off. And the demand for zinc alloys for die casting applications should cause this market to continue to expand.

WLB Panel Hears AFL Reasons for Request to Modify Little Steel Formula

Washington

• • • **A WLB panel** began hearings on April 4 on evidence submitted by the AFL in support of its request that the board seek authority to modify the Little Steel formula. Members of the panel are Ralph T. Seward, representing the public, chairman; Charles R. Hook, Jr., assistant to the president of the Rustless Iron & Steel Co., Baltimore, representing industry; and Edward J. Volz, New York, president of the AFL Photo-Engraving International Union, representing labor. Mr. Seward is an associate public member of WLB and impartial umpire of the Metropolitan New York milk industry. Philip S. Brayton, executive assistant to the public members of WLB, was appointed as special assistant to the panel.

In announcing the hearings, a board in a resolution pointed out that it can only recommend a change if, in its judgment, the formula is operating to create gross inequities and if the board is satisfied that changes could be made in the formula which would be consistent with the stabilization needs of the country and with provisions of the Act of Oct. 2, 1942.

"The fact that the board is prepared to consider evidence submitted to the panels on demands which would involve a modification of the Little Steel formula, should not be taken as an indication of any present decision on the part of the board as to whether it will or will not eventually seek a change in the Little Steel formula," said the statement.

Steel Case Research Committee Contests WLB Right to Hear Wage Demands

Washington

• • • **In a statement** concerning the War Labor Board jurisdiction in respect to the wage demands of the USWA-CIO from the steel industry, the Steel Case Research Committee presented to the Steel Panel of the War Labor Board on March 15, its views on the pending action. The statement of the committee, made up of executives of various steel producers, pointed out the limitations of the board and showed that the board should officially exclude the 17c. per hr. wage increase demand from the hearings and instruct the panel to receive no evidence with respect thereto.

Likewise, other demands of the union that increase labor costs may likely be outside the authority of the board under the Wage Stabilization law and regulations, since it is believed that they constitute forbidden wage increases and are an indirect but transparent effort to get what cannot be achieved directly.

A challenge by the CIO of the propriety of the Wage Stabilization law is acknowledged by the committee as proper, but it is pointed out that it is improper for the union to present such demands to the War Labor Board which has authority only to apply but not change the law.

The present stabilization statute will expire on June 30, 1944, unless renewed by Congress. Any renewal will involve Congressional consideration of the entire stabilization policy. Consequently, neither the steel panel or the War Labor Board should attempt to deal with "matters so clearly beyond its legitimate providence, creating confusion and resentment where clarity, understanding, and the preservation of lines of authority are so necessary for the determination of a matter of national concern.

Weirton Steel Makes Eleven Records In March

Weirton, W. Va.

• • • **Eleven new** major departmental records were set during March in plants of the Weirton Steel Co. The records set new highs for net tonnage produced in the blooming mill; galvanizing department; 48-in. hot mill; 48-in. mill, No. 3 continuous pickler; 48-in. mill, No. 5 tandem mill; 48-in. mill, total four high cold rolling; total production of the 10-in., 16-in., and 48-in. hot mills, total shipments of the 10-in., 16-in., and 48-in. mills; Weirton tin mill skin rolling; electrolytic tin plate production; and lacquer plate production.

WPB Eases Restrictions on Use Of Metals for Civilian Production

Washington

• • • **During the past** two weeks, WPB has eased the use of restrictions on various metals for the manufacture of a rather widespread line of commodities. Under Schedule IV to order L-216, restrictions on the use of alloy steel were removed for the manufacture of shanks for rotary files and burrs. An amendment to order L-142 eased restrictions on the weight of sheet steel used in metal sheathed doors for fire protection. Manufacturers of metal ferrules for wood-cased lead pencils and metal inserts for pen holders, under order L-227-b, are again permitted to use iron, steel, stainless steel, and zinc. The use of carbon steel or cast iron is permitted, under the amended order L-22, in feed door smoke curtains, feed door linings, hot blast lift doors, and upright shaker handles for furnaces.

Restrictions on the weight of iron and steel permitted in domestic cooking appliances and domestic heating stoves were removed in an amendment to order L-23-c. Also, an amendment to the aluminum order, M-1-c, permits the use of low grade aluminum ingot for topburner heads for stoves and ranges.

Restrictions on specifications for types of cast iron ware that are permitted to be made were removed in an amendment to order L-30-c. Previously, the number of sizes of various items listed in the order were restricted. Some of these items are skillets, griddles, household kettles, butchering kettles, and Dutch ovens. In the amended order L-250, restrictions on the use of steel for general purpose and semi-dust tight enclosures for floor mounted electric control equipment were moved. By the same amendment, the use of aluminum for data plates on such equipment was permitted.

Further signs of the easing of demands for metals and the growing civilian needs were noticeable in new quotas of civilian production made by WPB for three types of equipment. A program for production of $27,000,000 worth of commercial laundry equipment was approved for the year beginning April 1, 1944. Of this amount, about $10,000,000 worth, or about 33 per cent of a normal year's requirements, will be made available for commercial laundries, with the remainder going to the armed services.

Production of 50,000 cast iron bathtubs for limited distribution was approved for the second quarter of this year. Production was assigned to six manufacturers: American Radiator & Standard Sanitary Corp., Louisville, Ky., 10,500; Crane Co., Chattanooga, Tenn., 10,500; Kohler Co., Kohler, Wis., 10,500; Richmond Radiator Co., Uniontown, Pa., 10,500; Ellwood Co., Ellwood City, Pa., 5000; and Eljer Co., Salem, Ohio, 3000.

On the other hand, in the face of easing of supplies of materials, WPB found it necessary to tighten restrictions in some quarters. Restrictions were extended on the use of malleable iron castings and other materials in short supply by ordering that until further notice, operators of transportation systems may not use quarterly quota ratings assigned to purchase items of transportation MRO equipment. This was affected by an amendment to direction 1 of order P-142. Also, the amount of chromium metal exempt from restrictions has been reduced from 3000 to 250 lb., by an amendment to supplementary order M-18-a-1.

Price Briefs

Gas heater units—Charges for repair and maintenance of gas water and unit heaters may be increased in certain cases as the result of a change in the procedure of determining ceiling price for these services. Amdt. 1 to Sup. Service Reg. 22 to MPR Reg. 165; Amdt. 35 to MPR 165. (Release No. OPA-4107)

•

Ingots, brass and bronze—Increases have been made of 0.75c. per lb. in the principal grades of 85-5-5-5 alloy ingot and 1.5c. per lb. of the 80-10-10 group. Amdt. 4 to MPR 202. (Release No. OPA-T-1894)

•

Iron ore—Amendment states that persons selling Lake Superior iron ore may deliver or agree to deliver, and purchasers may receive or agree to receive, such ore at prices to be adjusted upward after delivery to an amount not in excess of the maximum prices established by OPA in taking final action upon the pending request for an increase in existing maximum prices. Order 7 under Section 3 to RMPR 113.

•

Pressure vessels—Sales of used pressure vessels and enclosed atmospheric pressure vessels installed underground and purchased for use in their present location, will be exempt from price control after April 7. Amdt. 3 to MPR 465.

Manufacturing Aid Given by WPB

Washington

• • • **Rules governing** acquisition of preference ratings and allotments for the manufacture of Class B facilities by a person who will make such facility for his own use when he is not regularly engaged in the manufacture of such facilities have been spelled out in an amendment to direction No. 34 to CMP Regulation No. 1.

In such a case, the person desiring to make the Class B facility should file an application for priorities assistance with WPB. The form generally used for this application is WPB-541 (formerly PD-1-a), although, in some cases other specific forms are designated by WPB orders and regulations. At the same time, the applicant must file a copy of form CMP-4-a covering the controlled materials which he will require for the manufacture of the facility. However, in filling out this form, the applicant need only give the following information: 1—Whether his application is for an increase in an allotment or is for an original allotment, 2—the name of the WPB division to which application is made, 3—the applicant's own name and address, 4—a designation of the product to be made, 5—the name and address and title of the company representative, and 6—information concerning the types of materials required for the manufacture of the Class B facility. This information is required in items 3, 4, 5, 6, and 7 and Section B.

This form will be processed by WPB in Washington, and if the manufacture of the Class B facility is approved, the applicant will receive the priorities assistance and allotments which he needs to make it.

However, if such Class B facilities are made in the normal course of the applicant's business, he must file Form CMP-4-b in order to obtain the materials required for its manufacture.

CMP Developments

Allocations—Means provided whereby a material may be obtained for a facility which is generally carried as a capital item, applying to both Class A and B facilities. Dir. 34 under Reg. 1.

•

Deliveries—It has been clarified that a "special item" as used in Reg. 2 is one that the producer does not usually make, stock, or sell, and one which he cannot readily dispose of in the course of his business. Int. 2 to Reg. 2. (Release No. WPB-5302)

Iron Ore Price Order Adjusted

Washington

• • • **Pending expected** action by the OPA on an upward revision of ceiling prices for merchant sales of Lake Superior iron ores, OPA on March 30 issued an adjustable price order covering 1944 shipments from Minnesota, Wisconsin, and Michigan. This order, covered by order 7 under section 3 of Revised Maximum Price Regulation 113, issued at the request of the Iron Ore Advisory Committee, provides that prices may be adjusted upward after delivery to an amount not in excess of the ceilings established by any revision in prices decided upon by OPA. The order will be automatically revoked upon the effective date of action taken by OPA, whether it grants or denies the request for higher prices. This action will affect about 22,000,000 tons of the 91,000,000 tons of Lake ore expected to be shipped downlake this season.

The adjustable price order was issued, OPA pointed out, because many uncertain factors in the estimate of operating costs for the coming year and the peculiar seasonal nature of the industry makes an immediate decision almost impossible.

Manpower is Bottleneck in Malleable Casting Production

Buffalo

• • • **Although common** foundry labor can earn as high as $4000 a year, Buffalo's malleable iron makers are being forced to turn down tonnage because of their inability to obtain an adequate supply of manpower. Jewell Alloy & Malleable Co., Inc., has turned down more tonnage in the last six months than it could make in five years. Ralph T. Rycraft, president, reporting that the malleable industry employs 56 to 60 per cent of every sales dollar for labor costs, said his firm "produced more tonnage in 1929 than for one-half what the present payroll is."

Lancaster Malleable & Steel Corp. is operating at only 70 per cent of capacity because of lack of help. "We could produce 25 to 30 per cent more if we could get the men," said Kenneth M. Smith, president.

Calling malleable iron a bottleneck in the war program, Alfred F. Crone, general manager of Acme Steel & Malleable Iron Works, Inc., estimated his plant could produce 30 to 35 per cent more if men were available.

Lake Shipping Quotas Are Periled by Heavy Help Draft

Washington

• • • **Because they** have little hope for deferment of essential personnel of draft age, some members of the WPB Iron and Steel Transportation Industry Advisory Committee expressed doubt at a recent meeting that the Great Lakes carriers will be able to meet all transportation demands for the coming season. Reports received at the meeting indicated that if the boats could be manned adequately ample shipping space is available for practically unrestricted transportation of ore, coal, limestone, and grain.

It was stated also that a review of the possibility of resumption of intercoastal iron, steel, and coal traffic by boat through the Panama Canal revealed little encouragement for the near future, chiefly because of congestion at both West Coast and Atlantic ports.

Priority Changes

Aluminum forgings—Producers of certain forgings will not be required to report their order books, unless directed to do so by WPB. Table 3 to M-293. (3-30-44)

Bathtubs, cast iron—Allocation was made for production of 50,000 tubs during the second quarter of 1944. Dir. 2 to L-42. (3-30-44)

Cast iron ware—Restrictions have been lifted on the quotas and types of cast iron ware which may be produced for civilian use. L-30-c as amended. (3-27-44)

Construction machinery—Certain restrictions on the use of metals in contractors' dewatering and supply pumps have been removed. Amended Sched. VII of L-217. (3-27-44)

Cutlery—Specifications on cutlery limited so as to conserve critical materials. L-140, as amended. (3-31-44)

Electronic equipment—If any radio part has been added or has to be added to a radio set since April 24, 1943, and before its transfer, then its transfer is not exempt from the provisions of the L-265. Int. 1 to L-265. (3-30-44)

Equipment, electric—To provide greater protection for electric control equipment restrictions have been lifted on the use of steel for general purpose and semi-dust tight enclosures for floor mounted control equipment. L-250, as amended. (3-29-44)

Equipment, food processing—Clarification measure shows that if on a given preference rating a supplier's name appears, the applicant does not necessarily have to go to that supplier, but may obtain his request from another supplier provided it is the same type of item. Int. 1 to L-292. (3-31-44)

Equipment, resistance welding—Use of CMP and general administrative forms now permitted in orders for resistance welding equipment. L-298, as amended. (3-31-44)

Equipment, safety—A relisting has been issued modifying scheduling of the items of tools and of safety and technical equipment under the provisions of the general scheduling order. Tables 10 and 12 to M-293. (3-31-44)

Ice boxes—Second quarter production of over 183,000 boxes has been assigned to specific companies. Sched. VII to L-7-c. (3-30-44)

Imports—Sixty-seven previously listed commodities removed from import control. M-63. (3-30-44)

Inventories—All regulations applying to the sale of idle or excess inventories by persons not regularly engaged in such business are brought under one document, thereby simplifying it. PR 13, as amended. (4-1-44)

Pen nibs—Producers may now make pen nibs of carbon steel. Frohibition against stainless steel as well as zinc has been removed. L-227-a, as amended. (3-27-44)

Rotary files—Restrictions on the use of alloy steel in the manufacture of shanks for rotary files have been eliminated. Amended Sched. IV to L-216. (3-27-44)

Scrap, stainless—Restrictions removed on the use of stainless scrap in the melting of stainless steel. Dir. 3 to M-21, revoked. (3-30-44)

Steel—Use of small quantities of steel for items which are deemed essential at this time now permitted. M-126, as amended. (3-31-44)

Stoves—Interpretation holds that the production of stoves with top work space is not prohibited. Int. 1 to L-23-c. (4-1-44)

Trucks, hand and lift—Restrictions on the use of ball bearings and other alloy steel products in swivel bearings and casters of two-wheel hand trucks, platform trucks and dollies has been lifted. L-111, as amended. (4-1-44)

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How to Keep Steel Mill Ladle Hooks *in Service*

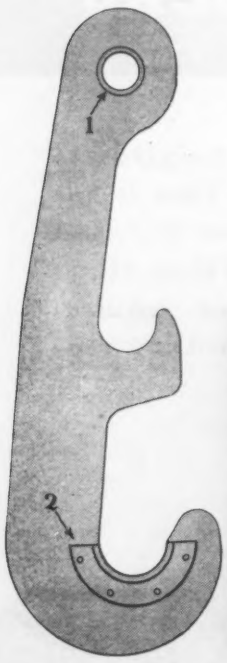
Of the numerous gadgets we make in manganese steel, bushings are the most common. Ordinarily, of course, a bushing is a hollow cylindrical piece fitted into a hole in a working part to take the wear and to be replaced as necessary, thus extending the life indefinitely of the larger piece, and saving a lot of money. That is the function of the bushing (1) shown on the right of our photo R-778—it fits into the top hole of the ladle hook in our sketch. The hook is 9 feet long and it might have to be replaced if the chain hole enlarged to the danger point from wear.

The piece in the foreground (2) is a half-bushing used on the same ladle hook, but in the "bight" of the lower end that picks up the ladle bail and must withstand the whole weight and friction of the tremendous load. Two half-bushings are used to a hook, the flanges being riveted to each side and the two "barrels" meeting above.

Manganese steel is used in such applications because it resists fracture under heavy stress and because the surface work-hardens under pressure and friction to an extent not equalled by any other steel.

Frankly, bushings are more important to the user than they are to us as a source of profit, but their performance illustrates perfectly the economy of "the toughest steel known."

Ask for Bulletin 543-G, "Manganese Steel for General Industry" or 1142-SM covering the steel industry.



Use of manganese steel bushings, as shown, increases the service life of these ladle hooks.

Why Amsco-Nagle centrifugal pumps render long service, told in Bulletin 940.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

Brown Co. Initiates Plan to Hire Vets

Philadelphia

• • • **A plan to** provide war veterans with employment opportunities, almost upon the heels of their discharge from military service, has been initiated by the Brown Instrument Co., manufacturer of industrial precision instruments. The plan includes cooperation with draft boards near the company's plant.

Brown, a division of Minneapolis-Honeywell Regulator Co., is providing each draft board within the 35-mile radius with a list, weekly, of the jobs open at the plant, the type of men required and what experience, if any, is needed for each task. In addition, the company offers these discharged war veterans an opportunity to receive instruction at the Brown school, in such cases where the veterans are qualified by experience or education to receive additional knowledge in the servicing, operation and maintenance of industrial instruments.

E. B. Evleth, vice-president of Brown and author of the plan, pointed out the results will be advantageous to the veteran, to the continued production of war goods and to the company.

Draft boards in the Philadelphia area reported their appreciation of the Brown plan and commended the company for providing a short-cut to veteran job placements.

Galvanizers Hold 14th Annual Meeting at St. Louis

• • • **Technical and** operating men of the galvanizing division of the steel industry will attend a meeting of the Galvanizers Committee to be held on April 17 and 18 at St. Louis. The committee, which is sponsored by the American Zinc Institute, will attend closed and general sessions. Several companies have been invited to present subjects of particular interest, including Wean Engineering Co. and Aetna-Standard Engineering Co. whose representatives will talk on "Continuous Hot Galvanizing of Sheet in Coils." Under the general subject of galvanized sheet treatments and finishes, Parker Rust Proof Co. will cover Bonderizing, New Jersey Zinc Co., the Cronak process, and Rheem Research Products, Inc., the Iridite process.

Making SHORT *work of long turns with* MAINTAINED ACCURACY

One of the complete variety of Kennametal tools available for lathe, boring mill, and milling machine operations.

The exceptional performance of Kennametal on long cuts works miracles in steel-cutting shops where taper is a bug-a-boo that means, at the best, expensive reworking and finish grinding, and at the worst, a high rate of rejections. Kennametal contains a unique intermetallic compound (tungsten-titanium-carbide) that gives it unmatched hardness. Used properly, it can remove stock from the toughest steel up to 3½ times more effectively than other carbides!

Our engineering staff knows and understands the amazing inherent characteristics of Kennametal and how best to apply them to any specific cutting job. There is an experienced field engineer in your district ready to help you select the right grade of Kennametal, and to determine the proper tool design and the most efficient machine set-up. When these factors are nicely balanced—Kennametal breaks production records!

Get acquainted with Kennametal. Write for our descriptive Catalog 43-C that contains information on tool design, use, and maintenance.

KENNAMETAL

Trade Mark Reg. U.S. Pat. Off.

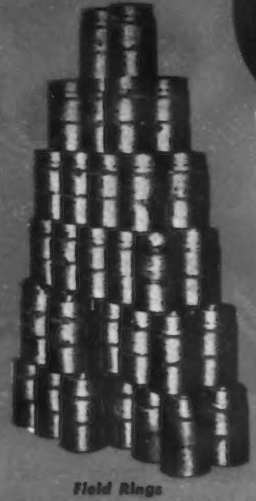
KENNAMETAL *Inc.*

144 LLOYD AVE., LATROBE, PA.

SUPERIOR CEMENTED CARBIDES

Weathervanes all!

Multiple Drill Base



Field Rings

Paper Rewinder

Every successfully welded fabrication points the way—encourages others to adopt the slogan—"If it should be welded, weld it".

Above is the base for a 5 station multiple drill. Weight 4445 lbs. Many machine tool bases and frames, of which this one is typical, are regularly being fabricated.

To the left is a pyramid of field rings.

Below is a rewinder for a paper mill. The drum was fabricated at United Welding Co. Other paper mill units recently fabricated include beater rolls, dryer frames, settling tanks, etc.

United Welding has the experience and capacity to handle your welding requirements. United also offers engineering counsel on how to change a drawing so the part can be welded to advantage. Submit your drawings. No obligation.

WELDING ENGINEERS · UWCO · MIDDLETOWN, OHIO ·

ARMY E NAVY

THE UNITED WELDING CO.

MIDDLETOWN, OHIO

WELDING FABRICATORS OF MODERN DESIGNS

Dallas Hits at Long Orgy of Spending

• • • **Pointing out** that "No one can look with complacency on the increasing taxation, and on the orgy of spending in this country which has been going on for the past 12 years," Donald C. Dallas, president of Revere Copper & Brass, Inc., urged that free enterprise must be restored immediately after the war. He was speaking as a representative of the Committee for Economic Development, at a luncheon sponsored by the Northeastern Roofing, Siding and Insulating Contractors Association in New York.

"The United States," he said, "can enjoy the greatest period of prosperity in its history, if we chart the proper course and concentrate on the production rather than on the redistribution of wealth. Our national debt will probably be more than 300 billion dollars by the time the war is over. The problem facing us is to cut governmental expenditure on the one hand, and to so balance taxation and incentive, on the other, that production is not destroyed and employment is maintained. Billions of dollars worth of savings will become available for the purchase of automobiles, houses, radios, electrical appliances and other consumer goods."

WPB Permits Development Of Products for Postwar Era

Washington

• • • **Under the** "laboratory" order, P-43, quotas and priorities may be given on materials to be used in development of products designed for future civilian markets. These may not be sold commercially at this time, but manufacturers may develop such models with the postwar market in view.

A revision of general preference rating order P-43 defines a "laboratory" as any person who carries on scientific or technological investigation, testing development or experimentation in his business, even though he does not have a separate department or organization in his company for such activities.

The order assigns preference ratings for such purposes to permit qualified users to obtain material for the development of products designed for future civilian markets. The only restriction on such development is that the company may not divert manpower, technical skills, or facilities from war work.

NAME YOUR "SPEC"

There's a Houghton U. S.-approved rust preventive ready . . .

Gov't Designation	Description	Houghton Product
2-82C	Heavy Rust Preventive Compound	Cosmoline 2-82C
2-84B Amend. 1	Light Rust Preventive Compound	Cosmoline 2-84B Amend. 1
AXS-673, Rev. 1, Amend. 2	Thin-film Rust Preventive Comp.	Cosmoline 945
AXS-674 Rev. 2	Medium Preservative Lubr. Oil	Cosmoline AXS-674 Rev. 2
AXS-702 Rev. 1	Light Preservative Lubr. Oil	Cosmoline AXS-702 Rev. 1
AXS-1001	Medium Rust Preventive Comp.	Cosmoline AXS-1001
AXS-1015 Amend. 1	Dip Coating Sealing Comp.	Cosmoline 910
14-C-4d	Rust Preventive Compounds Type "A", Grade 1 Type "A", Grade 2 Type "A", Grade 3 Type "C"	 Rust Veto N.A. Cosmoline N.B. Cosmoline N.C. Rust Veto N.S.
14-P-1C	Petrolatum Type	Cosmoline AN-VV-P-236
52-C-18	Thin Film Polar Type Rust Preventive Compound Grade 1 Grade 3	Cosmoline Brilco, Grade 1 Cosmoline Brilco, Grade 3
O.S. 627	Gun Slushing Comp., Grade "A"	Rust Veto Gun Slush
O.S. 709	Corrosion Inhibiting Comp.	Corrosion Inhibiting Comp. O.S. 709
AN-C-52 Amend. 1	Exterior Surface Corrosion Prev. Comp., Type 1	Cosmoline 911
AN-VV-C-576a Amend. 1	Aircraft Engine Corrosion Prev. Comp.	Cosmoline 900-A
AN-VV-P-236	Petrolatum Type	Cosmoline AN-VV-P-236
USA 3-182	Ignition Insulaton Comp.	Rust Veto 110-D
USA 50-11-37A Amend. 1	Shell Grease	Shell Grease 50-11-37A
P.S. 500	Bearing Rust Prev. Comp.	Cosmoline 955

FOR your quick reference, we print on this page a list of government specification corrosion preventives as of March 1, 1944, for which Houghton has approved products.

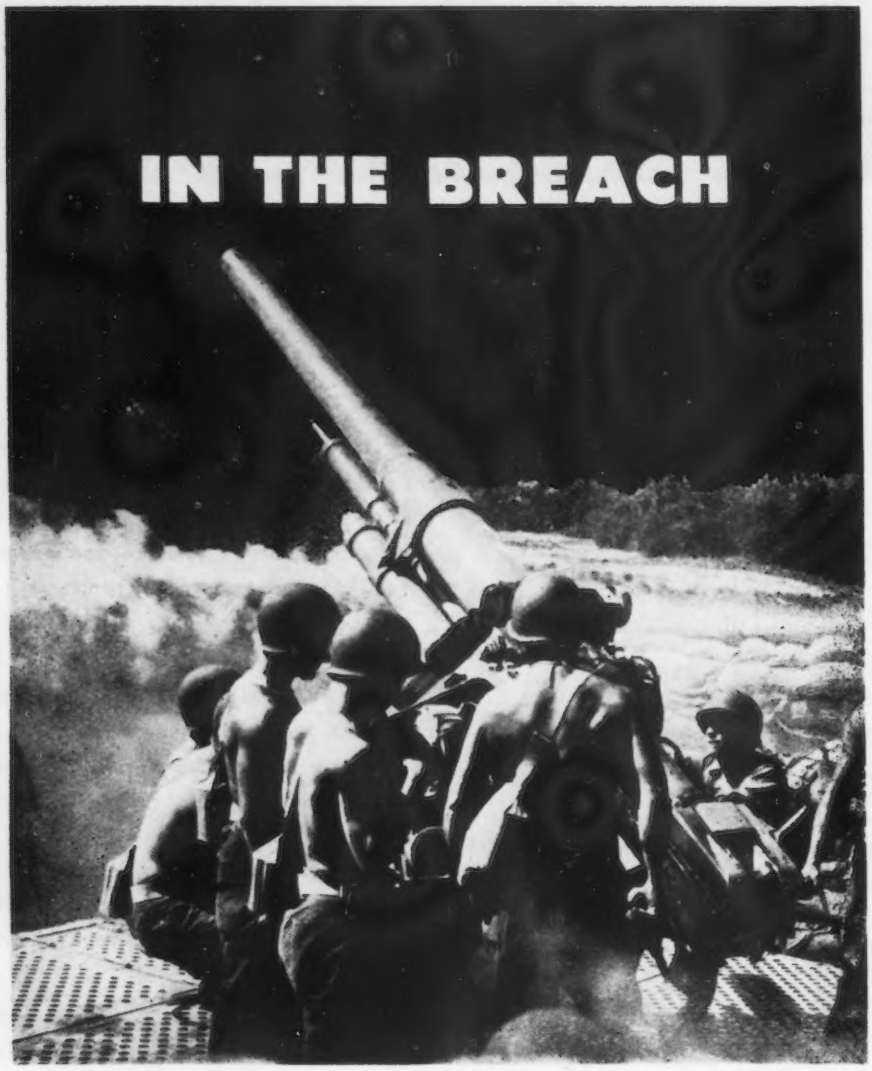
Never in our 76 years of rust prevention experience has there been such a keen interest in and demand for rust preventive compounds. Inspired by reports from overseas on the condition of metal parts and machines received early in the war, government and industry have cooperated on proper packaging, of which prevention of corrosion is an important feature.

When buying these products, the standing of the supplier is a considerable factor. Government approvals are only on samples submitted, and it becomes the buyer's responsibility to make sure that the preventives supplied in bulk to him are equal to the approved sample.

The ability of the supplier to duplicate sample qualities in actual production will depend upon his knowledge, equipment and experience. On all three points Houghton has a clear-cut, extended record. Your inquiries will receive prompt attention.

E. F. HOUGHTON & CO.
PHILADELPHIA
CHICAGO · DETROIT · SAN FRANCISCO

Houghton's RUST Preventives



A. P. photo

An ally you can count on—that's of major importance in metal cleaning and degreasing operations, today of all times in the face of round-the-clock war production demands.

Wyandotte Metal Cleaning Compounds are *just* such an ally. Specialized for their tasks, they are built to dish it out with instant effectiveness even where the going is toughest. Saving time and labor, they are long lasting, easy to use, and make friends with any budget.

Finishing operations are speeded, metal processing steps made smoother, more accurate the Wyandotte cleaning way. For that big or little challenge, for heavy duty or light, there's a ready and *reliable* cleaner in the Wyandotte family.

When new cleaning problems arise, *dependably* expert advice is needed on how to meet them. Why not consult the Wyandotte Representative, whatever your cleaning problem? He's always available.

Wyandotte

REG. U. S. PAT. OFF.

Service Representatives in 88 Cities

WYANDOTTE CHEMICALS CORPORATION • J. B. FORD DIVISION
WYANDOTTE, MICHIGAN

Gray Iron Castings Total 7,773,000 Tons for 11 Months

• • • **Data** covering shipments of gray iron castings in 1943 from January through November have been released by the WPB Steel Division as follows:

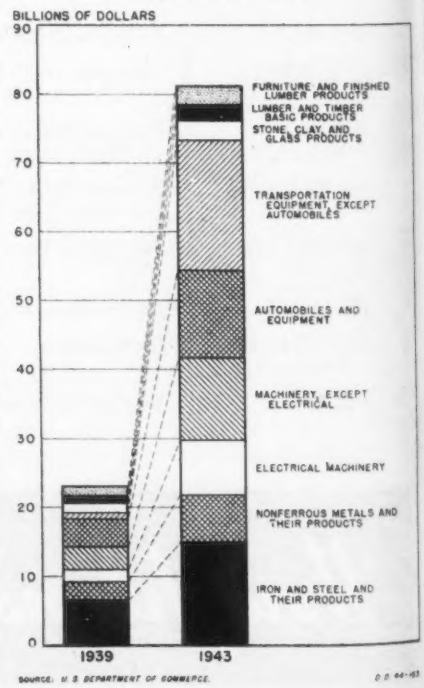
1943	Net Tons
January	622,907
February	613,240
March	720,311
Total—1st Qtr.	1,956,458
April	760,582
May	746,857
June	760,520
Total—2nd Qtr.	2,267,960
July	660,626
August	691,625
September	742,357
Total—3rd Qtr.	2,094,607
October	742,101
November	712,079

The above includes shipments of over 2000 gray iron casting companies out of a total of about 2214 domestic gray iron foundries. This provides about 93 per cent coverage.

For the first 11 months of 1943, the reporting foundries shipped 7,773,000 net tons of gray iron castings. During November, the gray iron casting industry operated at 50.9 per cent.

WPB says that with the exception of certain highly specialized castings, such as cylinder blocks and diesel engine parts, the industry has adequately met war requirements. As of Dec. 1, 1943, the industry had a backlog of approximately 2,134,000 net tons, equivalent to about six weeks' production.

MANUFACTURERS' SHIPMENTS: DURABLE GOODS INDUSTRIES



SOURCE: U. S. DEPARTMENT OF COMMERCE.

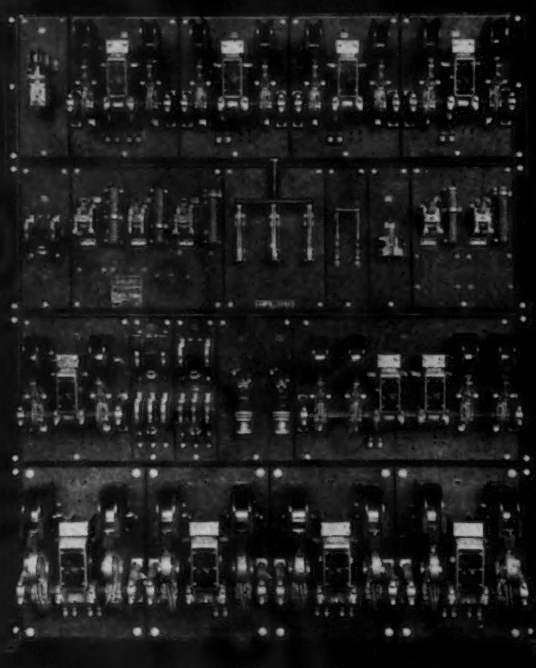
A NEW ALL A-c HOIST CONTROLLER BY EC&M

CONTRADYNE

(TRADE MARK)

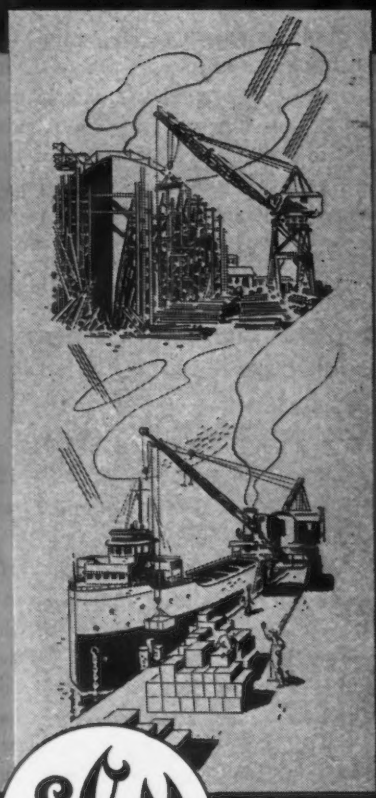
FOR SHIPWAY, FLOATING DRYDOCK, CARGO-HANDLING CRANES, ETC.

. . . A Selective System offering a wide range of speed regulation for all loads



Typical EC&M CONTRADYNE Controller for the hoist motions of A-c cranes.

Compact Type NT Master Switch. Narrow width permits close grouping of master switches for all motions within convenient reach of the operator.



Again

EC&M presents a new method of control for A-c crane hoist operation. Unlike any previous A-c hoist control, this controller has the following outstanding advantages:

1. Provides all the well-known advantages of the EC&M A-c dynamic lowering control for accurate handling of average crane loads (light loads or the empty hook).
2. Permits smooth regulation in the lowering of overhauling loads through long distances.
3. Used with a standard A-c wound-rotor crane motor and is operated directly from the A-c source of power without mechanical load brake or rotating conversion units.
4. Operator has control of the load at all times—brake sets instantly upon power failure or at will of the operator.
5. A simple controller of standard contactors and relays, easy to maintain and which, according to experience, requires only occasional inspection.
6. Compact and easy to install, saving valuable mounting space.

These efficient CONTRADYNE Controllers are already in successful operation on many cranes on prominent ship construction projects. Our nearby office will gladly explain the merits of CONTRADYNE Control for A-c service.

THE ELECTRIC CONTROLLER & MFG. CO.

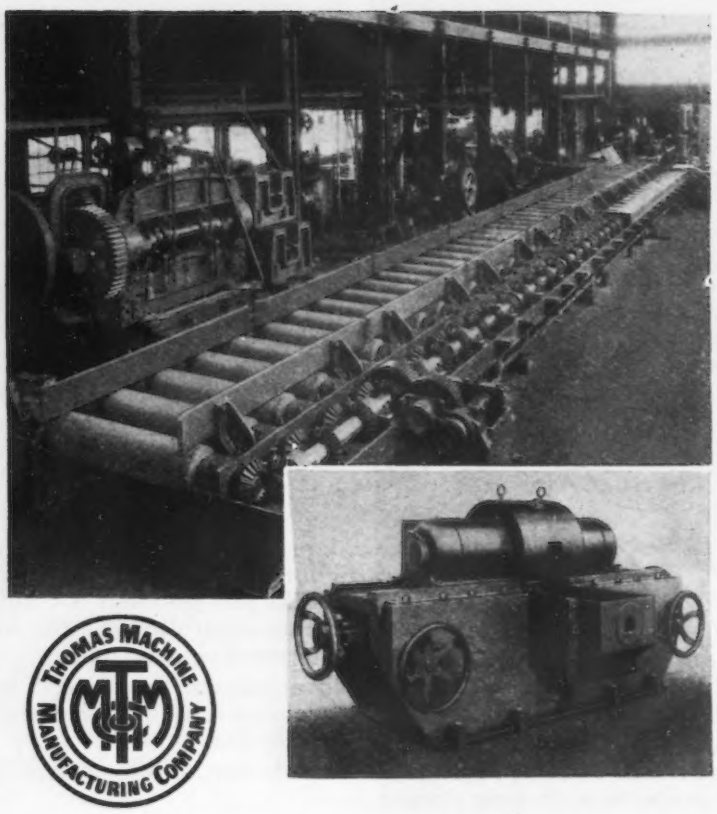
2698 EAST 79th STREET CLEVELAND 4, OHIO

SPECIAL MACHINERY BUILT ON CONTRACT

Special Machinery

PRESSES • PUNCHES • METAL-FORMING MACHINERY

BENDING AND STRAIGHTENING MACHINES • SHEARS



THOMAS MACHINE MANUFACTURING COMPANY

THE facilities of the Thomas organization are available for the production of all types of special machinery, both light and heavy.

We also invite your inquiries for contract work, dies, jigs and fixtures. Write for Bulletin 301.

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

Jahco Solves A Difficult Product Packaging Problem

Cleveland

• • • **Standard steel** pails will soon be utilized routinely by Jack & Heintz, Inc. of Cleveland, for export shipping of aircraft units such as starting motors and generators. This packaging idea, using steel pails with wooden internal bracing, was developed by Carl Dittman, an engineer of the company, with the cooperation of the Packaging and Container Control Branch, Army Air Corps, Wright Field and the American Can Co.

The Air Corps plans to place the dismounted starter in the same pail in which the new starter was shipped to the fighting front, providing a ready means for shipping it back for overhaul or for protecting it until overhauling can be done near the front.

The new method consists of supporting the unit inside the pail by wooden crating or hard pressed, molded shells of papier-mache, either of which will take the load in any direction, as shown in the accompanying illustration. Dehydrating chemicals are enclosed in the pail to take care of possible moisture in packing materials and in the air sealed in with the contents. Finally the steel pail is hermetically sealed by a rubber gasket in the cover.

Longfield Gets Post Vacated by Honeycutt

Washington

• • • **John T. Whiting,** director of the WPB Steel Division, on March 24 announced that C. H. Longfield, assistant director and chairman of the Production Directive Committee, will assume the duties of J. V. Honeycutt, assistant director for production, who has resigned to return to his former position with the Bethlehem Steel Co., Bethlehem, Pa. Mr. Longfield has been with WPB for more than two years, and he came here from the Youngstown Sheet & Tube Co. Mr. Whiting, who has resigned as director of the Steel Division, returned on April 1 to the presidency of the Alan Wood Steel Co. He is succeeded by Norman F. Foy.

Prelude TO A PERFECT FINISH

CHICAGO

MOUNTED WHEELS AND SMALL GRINDING WHEELS

A complete range of styles, grains and sizes up to 3" in diameter to give you a perfect finish on every job.

PROMPT DELIVERY

Specialization—with full W P B approval—on sizes 3" in diameter and under, means no waiting for Chicago Grinding or Mounted Wheels. Let us take care of your present and post-war requirements.

FREE ENGINEERING ANALYSIS

If you have a grinding job that presents a problem because of the nature of material, tricky shape or other reason, tell us about it. Our experts will go into a huddle and give you the benefit of our long experience making millions of custom built wheels for every conceivable operation.

YES, YOU CAN FINISH IT BETTER WITH A CHICAGO WHEEL

Half a Century of Specialization has Established our Reputation as the Small Wheel People of the Abrasive Industry.

ARMY E NAVY

MOUNTED WHEELS

SMALL GRINDING WHEELS

Just as the prelude to a new world is better tools of war, so the prelude to a perfect finish is better grinding wheels.

Today's standards of finishes are far and beyond those of yesterday. To acquire them without sacrifice of production time is a goal which everyone seeks.

Finish must now be measured in micro inches. That's where the new Chicago FV BOND Wheels excel. They give a precision smoothness so intensified that it passes any surface analyzer test, in many cases eliminating hand lapping and auxiliary finishing operations.

HERE'S WHAT MAKES CHICAGO WHEELS CLICK—

A—Sensational new FV BOND. Result of research and experiment on hundreds of aircraft jobs.

B—No sacrifice of cutting time or wheel life.

FV BOND is available in all types of Chicago Mounted and Small Grinding Wheels—in all abrasives, grain and grade combinations.

TEST WHEEL FREE—To prove their superiority in your own shop, send for a Chicago Wheel made with FV BOND. Give us details of the job, material you want to finish and we'll do the rest.

Write for Catalog and interesting Engineering Survey Form

CHICAGO WHEEL & MFG. CO.

1101 West Monroe Street Dept. RA Chicago 7, Ill.

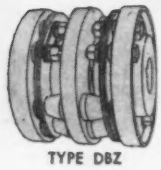
RA-4

Send Catalog and Survey Form. Interested in
☐ Grinding Wheels
☐ Mounted Wheels
☐ Send Test Wheel
Size _____

NAME _____

ADDRESS _____

THOMAS
Flexible COUPLINGS
FOR *any* SPEED OR SERVICE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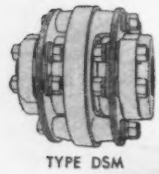
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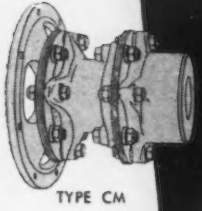
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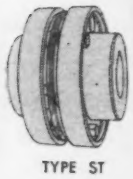
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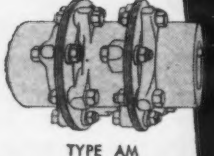
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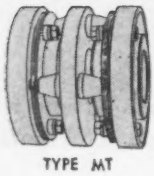
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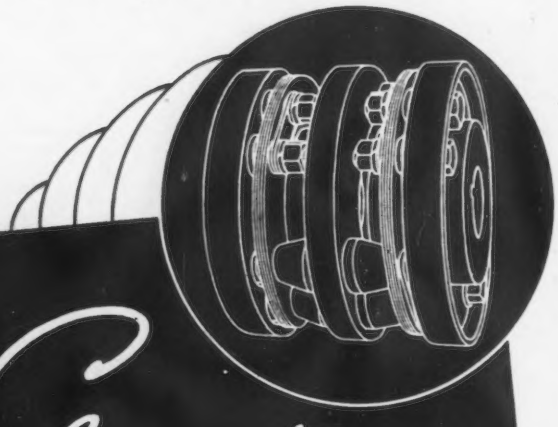


Eliminate

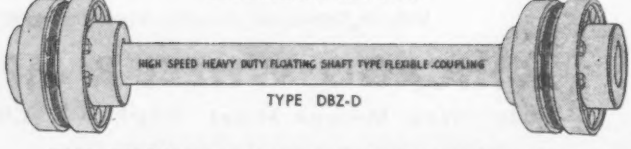
BACKLASH, FRICTION, WEAR AND CROSS-PULL

.....the 4 destructive evils found in all other types and makes of couplings.

NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT

These are the five essential features of Thomas Flexible Couplings that insure a permanent care-free installation.

WRITE FOR COMPLETE ENGINEERING CATALOG



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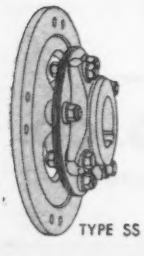
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THE THOMAS PRINCIPLE ELIMINATES CHAINS, SPUR GEARS and other VIBRATING MAKESHIFTS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Industrial Machinery Sellers May Pass On Higher Costs

Washington

• • • **OPA announced** March 20 that sellers of industrial machines and parts, whose costs have increased because their suppliers' prices have been raised under the automatic adjustment provision of the industrial machines and parts regulation, may apply to it for permission to pass on the resulting increase when the article is sold to another buyer. Increases permitted have no immediate effect on the cost of living since only industrial goods are affected.

The automatic adjustment provision permits resellers to adjust their maximum prices if they were based on lower suppliers' prices than those in effect to them on the base pricing date.

The provision has also been changed to make special provision for resellers who used the price lists of another to compute selling prices.

Under the regulation prices for items in Appendix A have a base date of Oct. 1, 1941, and items in Appendix B have a base date of March 31, 1942.

Hooks Says All Must Join to Plan Postwar Economic Policies

Cincinnati

• • • **Labor must join** with industry and government in working out common postwar economic policies for the post-war period, Charles R. Hook, president of American Rolling Mill Co., Middletown, Ohio, declared at Cincinnati, March 24, where he attended a conference of Committee for Economic Development executives of the Fourth Federal Reserve District.

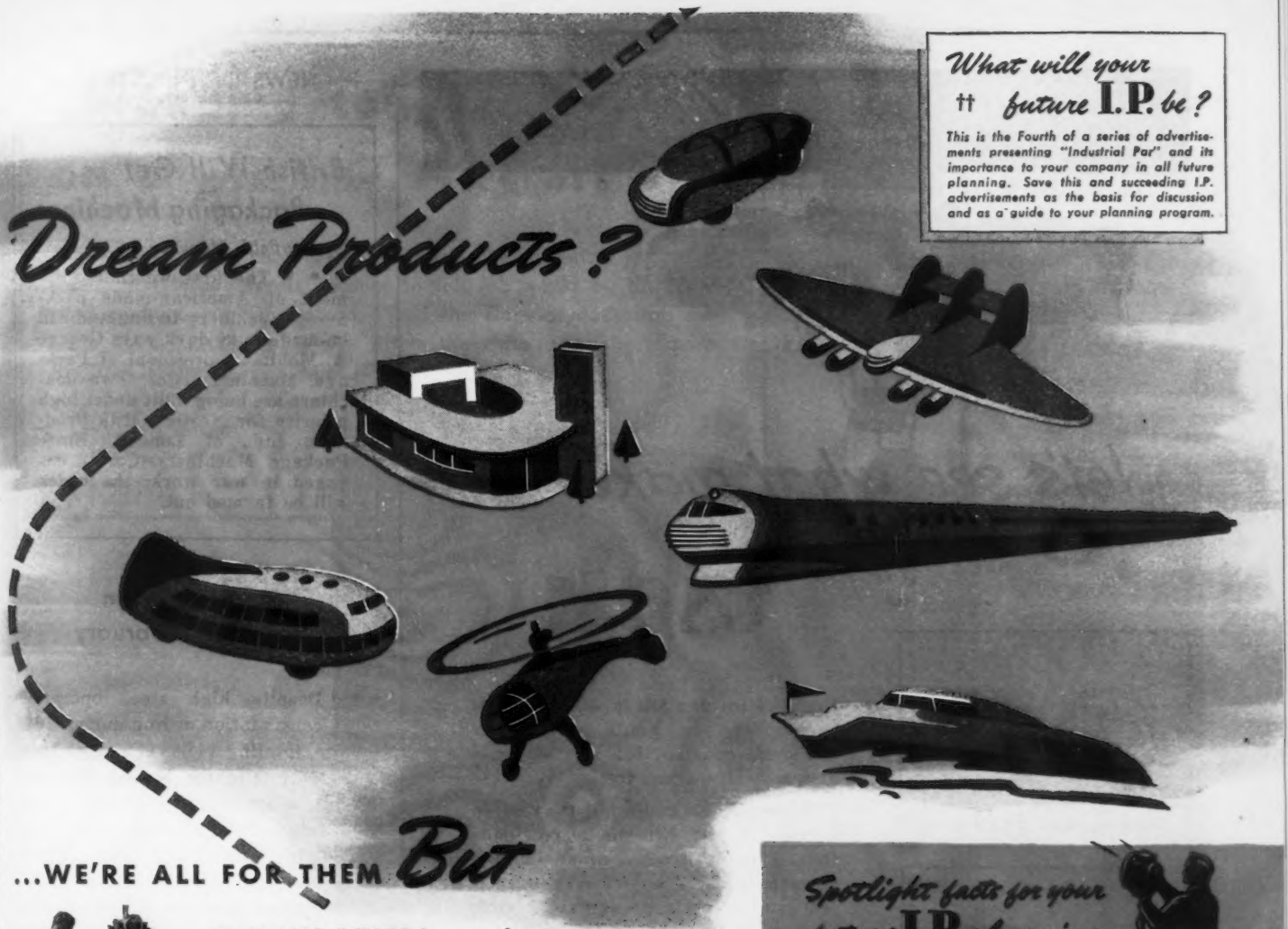
Mr. Hook stressed that America's prosperity in the postwar period will depend on this nation's ability to compete with the products of other nations where living standards are far lower than those in the United States. For this reason, he indicated, labor must come to agreement with industry on economic policy which will protect the interests of industry and labor in common.

George D. Crabbs, regional director for the CED in the fourth district, in another interview, listed revision of the American tax structure as one of the 15 projects on which CED research men are at work.

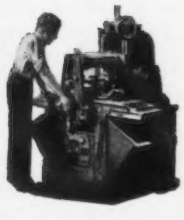
What will your †† *future* **I.P.** *be?*

This is the Fourth of a series of advertisements presenting "Industrial Par" and its importance to your company in all future planning. Save this and succeeding I.P. advertisements as the basis for discussion and as a guide to your planning program.

Dream Products?



...WE'RE ALL FOR THEM But



STRATO-LINERS, tear-drop cars, super-streamlined passenger trains, pre-fab houses, electronic gadgets in every home, helicopters and many other "dream products" have been heralded as the stepping stones to new prosperity after the war.

Without minimizing their importance, we feel these things to be still pretty much in the "dream" stage. There's no question in our minds that they will contribute substantially to our world of tomorrow — many of America's great industries, providing work and wages for millions, had their origins in the ideas, experiments and vision of creative, imaginative men — but such things take time to develop.

The gap between wartime production and peacetime manufacturing will most likely be shortened by the making of prosaic things — things we already have and use which war either suspended or curtailed.

One doesn't have to be a crystal-ball gazer to realize that the peacetime future isn't so unpredictable after all. Those manufacturers who are pointing their postwar planning to the production of quality products — in quantity — at low cost — can be quite sure of being among those "most likely to succeed" in the peacetime to come.

To accomplish that objective, machine tools — the most modern and advanced types — are indispensable.

For only with the most modern machine tool equipment can manufacturers hope to attain or excel national industrial par — the vitally significant situation which all must face as summarized in the panel "Spotlight Facts for Your Future I. P. Planning." And only as *industrial par* is maintained or excelled by industry as a whole can a high level of national prosperity — its benefits in terms of jobs and wages for the greatest number of workers — be achieved.

Let's all back the attack! **BUY MORE BONDS**

Spotlight facts for your future I.P. *planning*

- Production methods — developed in wartime —increase man-hour output; pent-up buying power — released in peacetime — demands increased production.
- The rate of 2½% increase per year output per man-hour, established by a 12 year record of industrial production, can be expected to reach at least 4% per year — compounded.
- Manufacturers must set a goal of 50% increased output per man-hour every 10 years — to maintain a high level of national prosperity and achieve its benefits in terms of security of jobs and wages for the greatest number of workers and the volume production of more goods for more people at lowest cost.
- Machine tools — the most modern, most efficient — are recognized as the most effective implements of mass production and increased output at lowest cost — but only continual replacements with the newest and finest machine tools assures full productive capacity. *Such replacements yearly should be equal to 10% of the total machine tool investment — in keeping with increased output.*
- The cost of machine tools is insignificant in terms of their productive power . . . from 1927 to 1937, according to census reports, American manufacturers had only a total of about 2% invested yearly in machine tools in ratio to a total volume of 9 billion dollars' worth of production annually.

†† **Industrial Par** — *the constantly increasing output per man-hour equal to approximately 50% every 10 years.*

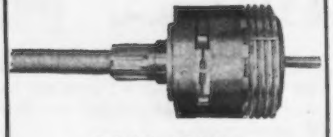
KEARNEY & TRECKER
CORPORATION
MILWAUKEE 14 WISCONSIN

Milwaukee Machine Tools

let's see what makes it

tick

PLANETARY GEARING



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106 pages—amply illustrated with sectional views and line drawings. Describes maintenance of entire line of Shepard Niles Electric Cranes & Hoists.

Ever look inside a Shepard Niles hoist? If you did, you would find exactly the same construction as used on a Shepard Niles crane trolley.

While a single beam hoist is seldom called upon to lift the heavy loads that a crane trolley must handle, nevertheless, the service very often is just as severe. Recognizing this, Shepard Niles simply eliminated the axle bracket arms of their Shepard-type crane trolley, provided suitable means of suspension, and a hoist, capable of the toughest kind of going was the result.

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British Will Get Packaging Machines

Springfield, Mass.

• • • **The first wartime shipment of American-made packaging machinery to England will be made in 90 days, says George A. Mohlman, president of Package Machinery Co. Two machines are being built under high priority for Nestle's Milk Products, Ltd., of London. Since Package Machinery Co. is engaged in war work, the order will be farmed out.**

Lake Ore Consumption Down Slightly in February

Cleveland

• • • **Despite high** steel operating rates, consumption of iron during 1944 to date, totaling 14,688,995 gross tons, is lagging slightly behind the 14,869,088 gross tons consumed during the same period of 1943. Ore consumed by furnaces in the United States through February totaled 14,289,011 gross tons, as compared with 14,482,880 tons during the initial two months of 1943. This report was made by the Lake Superior Ore Association.

February ore consumption in the United States and Canada amounted to 7,207,342 gross tons, down slightly from the 7,481,653 tons consumed in January.

Ore stocks at Canadian and American furnaces and lower Lake Erie docks on March 1 amounted to 28,909,576 gross tons, as against stocks of 36,059,302 tons a month ago and 32,743,294 tons a year ago. Furnace stocks in the United States were 23,312,322 tons, and in Canada were 1,044,218 tons, totaling 24,356,540 tons. Stocks at Lake Erie docks were 4,553,036 tons on March 1.

Furnaces in blast using Lake Superior ores totaled 184 during February, while 12 furnaces were idle.

•

• • • **Iron ore** production in the United States in January totaled 2,753,535 gross tons, down 16 per cent from December, according to the Bureau of Mines. For the second month, Michigan output has exceeded all other states, mainly because underground operations are not hampered by Winter weather.

Threading tough steel *fast* on a *precision* Aircraft Job

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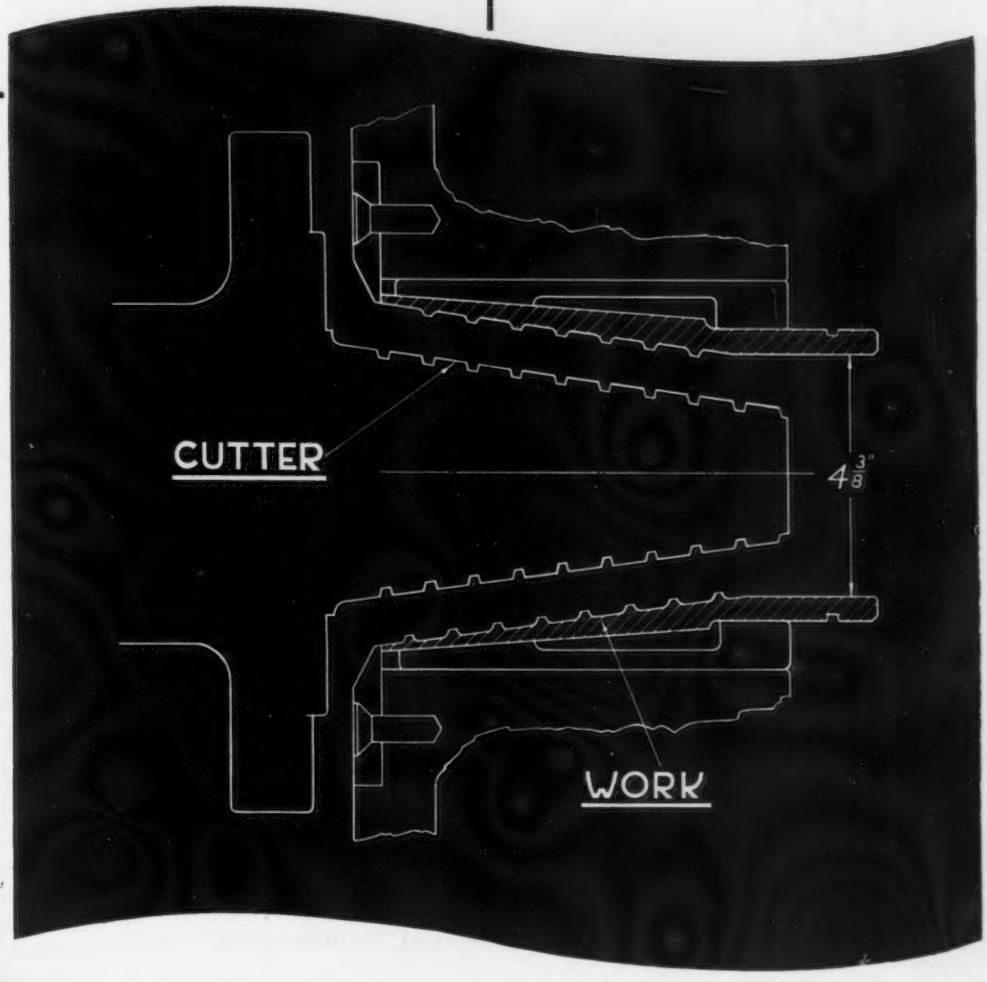

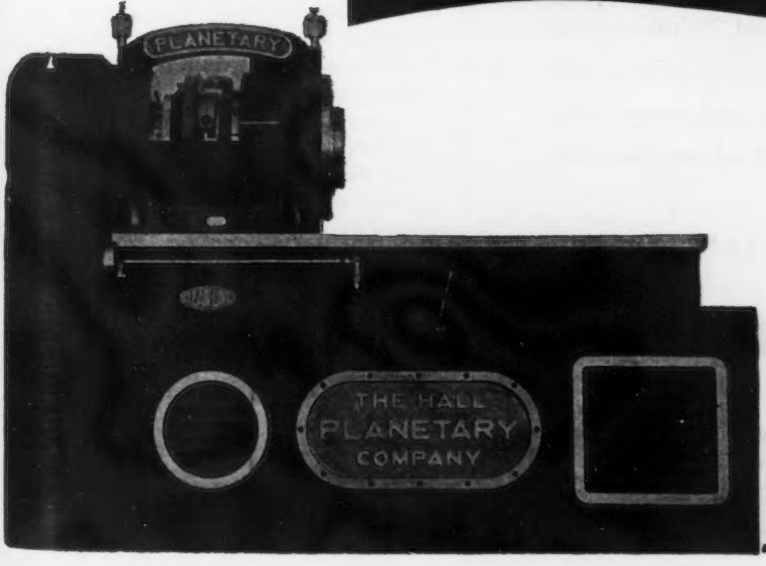

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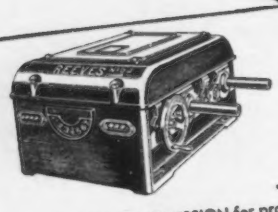

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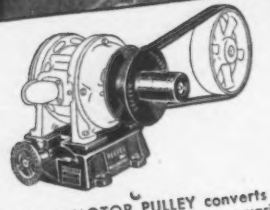

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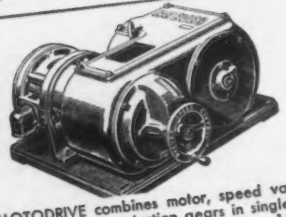

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WPB Reports on Grader And Bulldozer Output

• • • **Total grader** shipments in 1943, according to the WPB, were 5320, while shipments of angledozers and bulldozers amounted to 16,110. Of the three types of grades, motor graders accounted for about 66 per cent of total output. Of nine companies manufacturing graders in 1941, eight are at present making shipments of this class of construction machinery.

The 18 companies which made shipments of 'dozers in 1943 accounted for about 99 per cent of this equipment.

Graders

Year and quarter	Shipments	Unfilled Orders (end of quarter)
1937—Total	7,560	.....
1939—Total	5,530	.....
1941—Total	7,560	.....
1943—1st	960	4,400
2nd	1,450	3,900
3rd	1,460	4,960
4th	1,450	4,800
1943—Total	5,320	.....

Angle and Bulldozers

Year and quarter	Shipments	Unfilled orders (end of quarter)
1942—4th	2,960	5,210
1943—1st	3,480	9,910
2nd	3,930	11,290
3rd	4,120	14,490
4th	4,530	13,010
1943—Total	16,110	.....

Parmelee Claims Railroad Outlook Is Favorable

Cleveland

• • • **In an address** before the American Marketing Association at Cleveland recently, J. H. Parmelee, of the Association of American Railroads, summarized the railroad situation. He said that it seems likely that railroad traffic and gross earnings will attain higher levels in 1944 than in any previous year, will taper off in 1945, and decline still further in 1946 and 1947, although remaining above the annual average of the three years immediately preceding our entry into the war.

With constructive leadership after the war, the railroads will maintain their position as the major agency of transport in the United States, and will obtain such a volume of traffic as will assure the future of the industry. Achievement by rail carriers of a stable financial position will benefit a wide circle outside the industry itself.

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Canada's Railroad Orders Are Heavy

Ottawa

• • • **Canadian companies** have received large orders for railway equipment for the combat areas, and locomotives for shipment overseas are being produced at the rate of 24 per month. Railway equipment manufacturers are working to full capacity on the production of freight cars and other types of rolling stock.

Tank capacity is being used to produce self-propelled gunmounts, of which the details have not been released, except it has been intimated that the guns are mounted on the Canadian-designed Ram tank chassis. All orders for tanks were completed in 1943. According to reports 1400 Valentines were delivered to Russia, and up to July 1 more than 1700 Rams were produced.

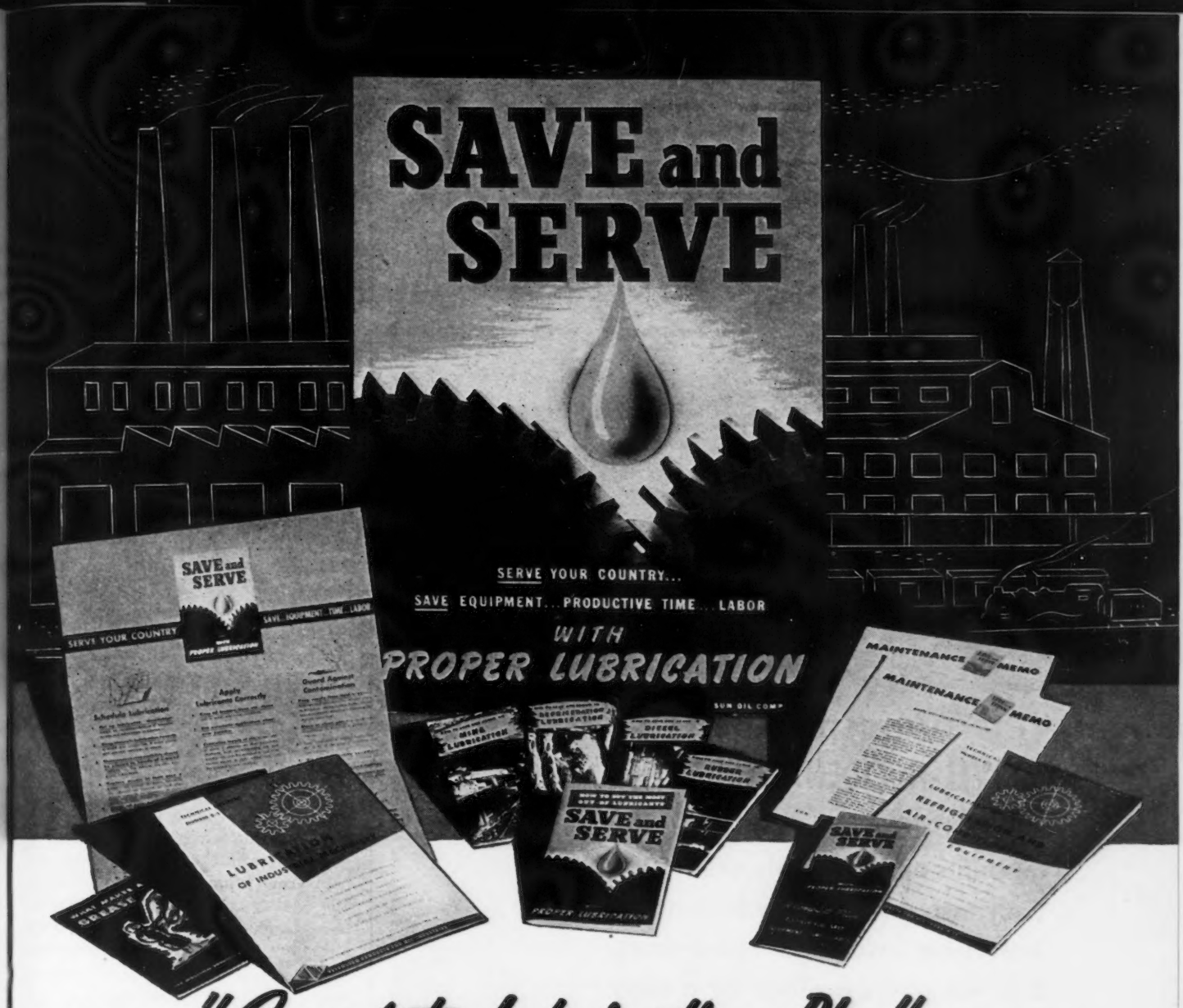
Warehouses Permitted to Handle Wider Product Range

Washington

• • • **Rules governing** purchases by distributors of most steel products have been simplified and liberalized, this action being taken by amending general preference orders M-21-b-1 and M-21-b-2, governing general steel products and merchant trade products. The amendments apply only to distributors and do not affect restrictions on deliveries to users of steel, whether by producers or distributors.

Previously a distributor was permitted to order only such merchant trade products and general steel products from producers as the distributor ordered from producers during his base period. But under the amendment distributors may order any items except steel plate, tubing, and hot rolled sheet and strip from producers or any other source, without restriction except that such purchases are limited to the tonnage previously sold from stock. In addition distributors may order without limit from holders of idle or excess inventories. Such orders have the status of authorized CMP orders.

New distributors are now permitted to enter the field freely, old distributors are permitted to add new lines to their stocks and distributors who have not bought from producers heretofore are now permitted to do so. However, initial stocks of new distributors must be purchased from idle and excess stocks.



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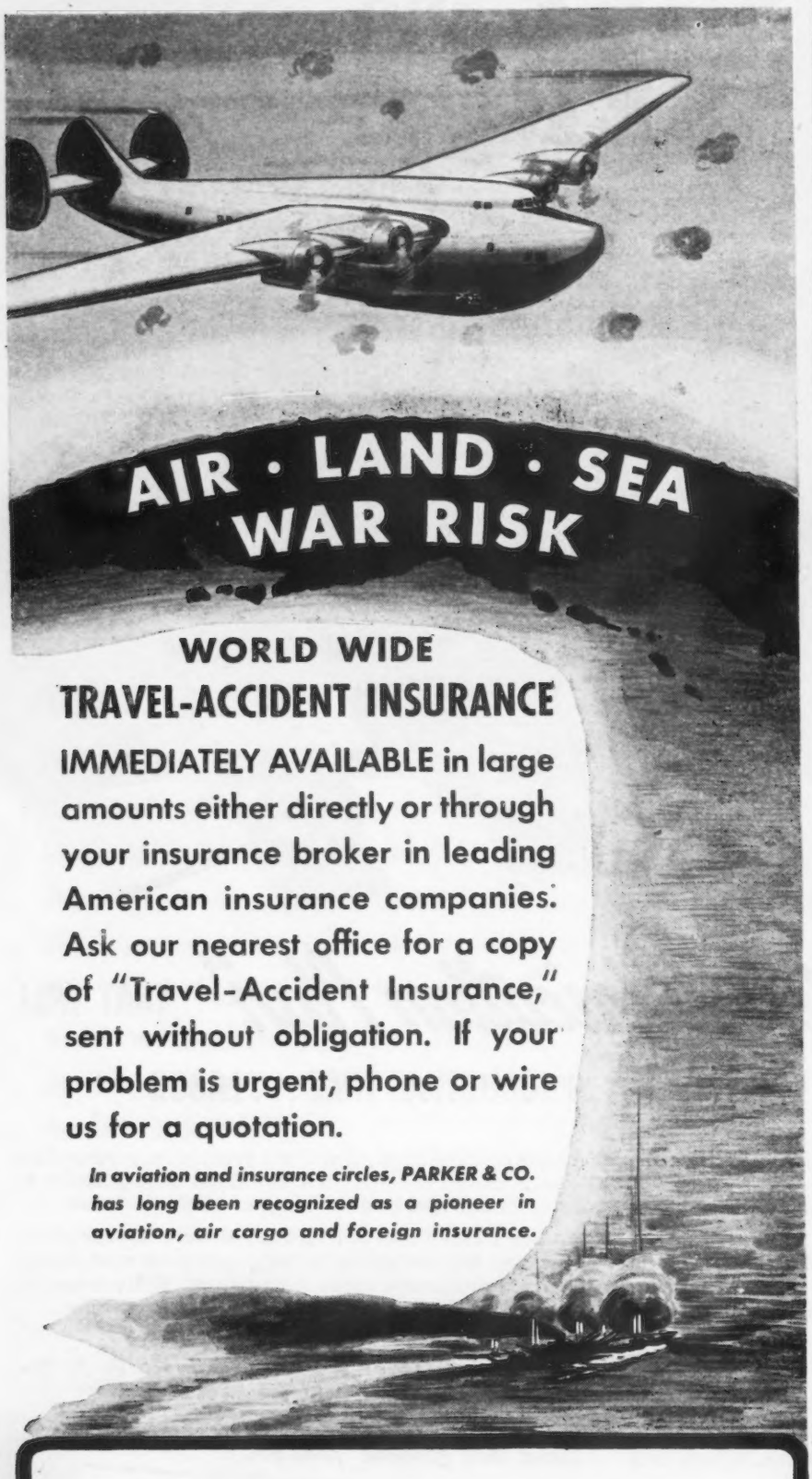
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Steel Makers to Convene for Spring Technical Meeting

Pittsburgh

• • • **The great variety** of operation and maintenance problems that more than two years of peak production have brought to blast-furnace and openhearth plants of this country will occupy a large part of the time of the operators and metallurgists in these two leading branches of the steel industry at the 27th annual conference of the National Open Hearth Steel Committee and the Blast Furnace and Raw Materials Committee of the AIME Iron and Steel Division, scheduled for April 20 and 21 at Hotel William Penn, Pittsburgh. Twelve technical sessions will be held at the two-day conference.

In addition to the important discussion by the basic open-hearth operators of recent progress in maintenance, operation, and quality, there will be three unusual sessions. The first will be devoted to the problems that have developed in the past year or two as the result of constant maximum operation, especially those evident from tying in furnace schedules and quality with 100 per cent production. Leaders in the field will describe how they have solved these problems.

The second session covers combustion in the open hearth furnace. The third innovation in this year's basic openhearth program is an entire session on refractories and masonry.

Another new feature at the conference this year is a separate session on metallurgy, designed to bring recent developments in the science of openhearth steelmaking to the attention of operators and plant metallurgists. Topics on this session include slag-bath reactions in the basic and the acid openhearth, the determination and the effect of hydrogen and nitrogen, methods for the control of grain size, and recent data on the addition and effect of boron and other hardenability intensifiers.

The acid open hearth group will hold a separate session with discussions on gas and on the prevention of flaking in acid steel. This group will meet jointly with the basic operators to consider combustion and metallurgical problems.

The program for the Blast Furnace and Raw Materials conference has eight formal papers and considerable discussion scheduled for four sessions.

FACTORS THAT ARE IMPORTANT TO BROACH EFFICIENCY!

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DIVISION OF THE ANDREWS STEEL CO.

The Andrews Steel Company produces a limited range of aircraft quality alloy plates

Latest Installment Of Seized Patents

• • • Here's another list of seized patents available on license from the U. S. Alien Property Custodian. This is the 21st installment in a series which started in this magazine last Nov. 4. The number in parenthesis at start of each item is its sub-class number.

Class 79 Metalworking

(37) 1,716,532. Multi-spindle turret lathe provided with a stationary workholder, a main tool-slide which is driven by a spindle axially of the work, and lateral slides moved transversely to the length of the material. Fritz Poppensieker, Ge.many. 6-11-29.

(37) 1,964,213. Turret bearing for automatic multi-spindle turret lathes. Allows the pressing of the drum in every indexing position against an axial thrust bearing by a special clamping device, thus avoiding the inaccuracies derived from the axial play. Fritz Poppensieker, Germany. 6-26-34.

(37) 2,054,521. Multi-spindle turret lathe for bar stock having a plurality of spindles and which allows recharging of the guiding device for the bar stock to be effected while the lathe is still running. Fritz Poppensieker, Germany. 9-15-36.

(38) 1,719,238. Machine for drilling keys, wall dowels and similar articles and for milling surfaces. The spindle heads and chucks are ar.anged on a revolving plate or star-shaped frame. Erich Sander, Germany. 7-2-29.

(38) 1,870,724. Multiple spindle automatic screw machine adapted to simultaneously and progressively work upon a piece at several spindles, so that a piece is finished after each turning of the drum. Anton Gerstadt, Germany. 8-9-32.

(38) 2,268,135. Device for clamping or holding work pieces upon a movable work piece support which is provided with several clamping devices. Ewald Dornhofer, Germany. 12-30-41.

(38) 2,271,583. Controlling device for automatically operating revolving tools which engage work pieces one after the other. Ewald Dornhofer and Robert Obtresal, Germany. 2-3-42.

(39) 2,094,816. Automatic single spindle

SPINNING GYROSCOPE: *Worker at plant of Minneapolis-Honeywell Regular Co. is shown at "tilt table" which is made to hold electronic automotive pilot so that instrument is exactly parallel to the earth's axis.*

COPYRIGHT 1944—JONES & LAUGHLIN STEEL CORPORATION

FROM AN ORIGINAL DRAWING AND SKETCHES BY ORISON MACPHERSON

CONTROLLED QUALITY STEEL FOR WAR

FLOWING IRON

Flare of conflagration, showering sparks, a blinding white, flowing stream of iron are background for the technicolor action in the cast house of a blast furnace when the iron "notch" is tapped and the metal runs out.

Like wisps of fog, soft blue haze arises from the gutters while molten iron flows inside their sand-made banks, gurgling and sparking as it hurries to ladles waiting on railroad tracks below. Seen dimly through the hot haze and silhouetted against the glow, the "keeper" of the furnace and his skilled crew go about appointed tasks in perfect teamwork. Some at the "skimmer" which separates slag from iron, some to open other runners to other ladles, or to break up floating islands of slag.

Flowing iron spurts and splatters molten drops when the cast comes to an end. The air blast throbs and pulsates. The furnace breathes heavily like a winded monster. The escape valve, released by the blower, roars thunderously. Quickly the mud gun is swung into position to plug the "notch" with clay, and the iron is on its way to the open hearths and Bessemers, to become steel, spearhead of invasion, measure of freedom.

The gorging big stacks, during long hours between casts, stand purring and hissing, letting out a wisp of steam now and then, while the intense heat of fiery coke within their fat, brick-lined bellies smelts iron ore, and burning limestone fluxes impurities into slag.

Blast furnaces are fed at their tops from cable-drawn bucket cars on tracks. These "skip hoists" daily haul up thousands of tons of iron ore, coke and limestone from mountainous stock piles.

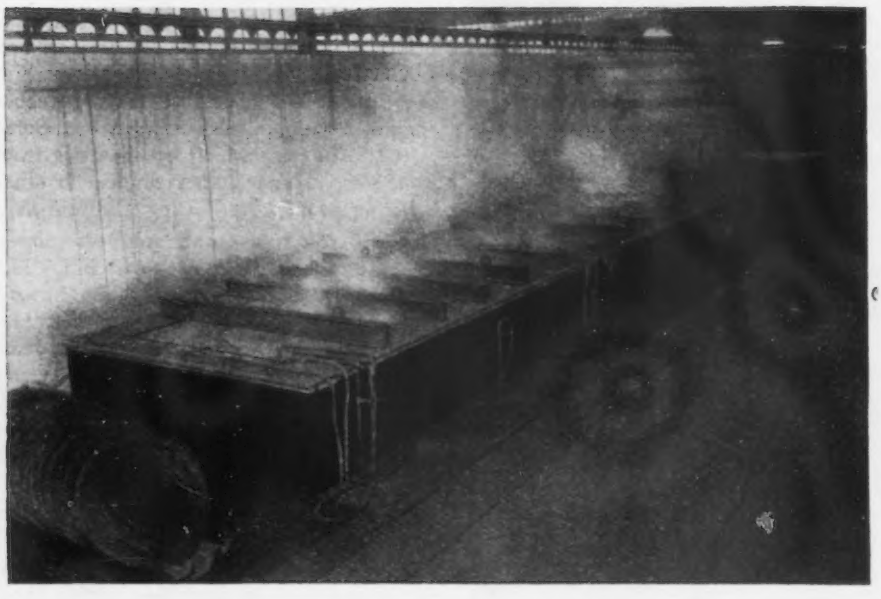
175 million tons of heated air a year are blown into the blast furnaces of America to fan the coke fuel to smelting heat. This air—"wind" furnace men call it—is preheated to 1,200 degrees F., attains velocity of 100 to 300 miles per hr. compared to 150 miles per hr. for hurricanes.

The spectacular flame throwers you see when you pass through a steel town are not blast furnaces, but Bessemer converters (origin of the "hell-with-the-lid-off" cliché) burning carbon, silicon and manganese out of molten iron to "convert" it into steel.

Submarine ladle, shown in illustration and used to convey molten iron from the blast furnaces to the steel works, was cooperatively developed by J&L, is now in use in other plants, can hold iron in molten state 24 hours.

Bead catalyst, strange, rugged agent recently developed by Socony-Vacuum Oil Company, Inc. for aviation gasoline, will greatly increase aircraft engine available power output. In peace-time aviation these new aviation gasolines will mean swifter, more extended, safer world transportation. A catalyst changes the arrangement of the hydrocarbons in gasoline in some mysterious manner to produce better fuel. The bead catalyst resembles a pearl-colored bead.

BASOLIT
PICKLING TANKS



The above picture shows a three section BASOLIT wire pickling tank 70′ long x 10′ wide x 7′ deep, installed August 1935 at the Sheffield Steel Corp., Kansas City, Mo.

Constructed with an inner lining of acidproof brick jointed with BASOLIT, and outer lining of reinforced concrete — also available in combination with rubber lined steel outer shell.

The installation illustrated is one of many hundreds where BASOLIT has contributed toward long life and efficient operation of modern pickling equipment.

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Austin, Dallas, Houston
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turret lathe in which an open frame is provided with a tool slide suspended from and guided on the upper cross beam of the frame. Fritz Poppensieker, Germany. 10-5-37.

(40) 1,805,998. Screw cutting device for single and multi-spindle automatic lathes in which the threaded mandrel rotates unidirectionally in a rotary mandrel guide and is caused to screw out of and into said guide by being driven alternately at a speed smaller than or greater than the speed of rotation of the mandrel guide. Otto Schaerer and Fritz Poppensieker, Germany. 5-19-31.

(40) 1,844,191. Screw cutting appliance for lathes which enables a worker to operate with an overtaking threading tool on turret lathes by effecting an alternating drive for the threading-tool holder through the shaft of the turret head which causes the holder to be operated at a faster rate for threading and at a slower rate for unscrewing. Karl Tessky, Germany. 2-9-32.

(42) 2,094,817. Means for driving the longitudinal slide in a turret lathe. Fritz Poppensieker, Germany. 10-5-37.

(43) 2,235,073. Automatic turret lathe in which adjusting means and bearings are provided so that, in addition to the usual automatic longitudinal travel of the revolving tool turret, an automatic cross travel is possible, the movements being carried out consecutively or at the same time and irrespectively of the position of the compound slide rest. Erich Leistner, Germany. 3-18-41.

(44) 2,124,216. Automatic lathe that can be changed in a simple manner so as to enable it to operate on metals of different physical properties. Karl Tessky, Germany. 7-19-38.

(46) 1,915,375. Machine tool with reciprocating carriage (turret lathe or the like). Walter Mobius, Germany. 6-27-33.

(49) 1,895,057. Tool holder for lathes or like machine tools in which a device is incorporated for raising or lowering the cutting tool with great exactness. Rudolf von Frommer, Hungary. 2-24-33.

(49) 2,202,117. Multiple tool holder consisting of a support, a base portion secured to said support, a cutter holding head, freely pivotable about an axis with respect to the base portion, and two self-centering substantially plane crown-toothed rings. Konrad Muller, Germany. 5-28-40.

(49) 2,135,639. Tool holder for turret lathes wherein a number of different tools are mounted to perform the several operations necessary in machining a workpiece. William Gorham, Japan. 11-8-38.

(50) 1,988,675. Apparatus for indexing turret heads in which the indexing is varied. Karl Tessky, Germany. 1-22-35.

(51) 1,737,208. A blank-transferring appliance for machine tools, for the manufacture of hexagonal and other nuts. Karl Tessky, Germany. 11-26-29.

(51) 2,042,687. Automatic lathe in which the work piece is machined at different stations. Karl Tessky, Germany. 6-2-36.

(53) 1,643,635. Automatic screw machine which has a cutting means with the feeding mechanism in such a way that the cutting means moves forward together with the material. Lorenz Konrad Braren, Germany. 9-27-27.

(53) 1,853,074. Controlling means for automatic and semi-automatic lathes with means for rotating the outer control ring continuously in one direction at two different speeds alternately. Friedrich Mulka, Germany. 4-12-32.

(53) 2,028,362. Automatic lathe with friction clutch. On one of the parts constituting the clutch, helical ribs are provided for effecting a flow of the ambient air whereby this part is cooled. Karl Tessky, Germany. 1-21-36.

(53) 2,113,668. Lathe in which the spindle can be reversed for running in either direction by means of a double friction coupling. Karl Tessky, Germany. 4-12-38.

(53) 2,179,744. Clutch releasing mechanism for the thread-cutting spindle of an automatic lathe. Helmut Junghans, Germany. 11-14-39.

(56) 1,858,754. Lathe having rocking tool holder arms. The rocker for an additional tool is mounted to rock about the axis of one of the other rockers, which are arranged in the usal manner. Karl Tessky, Germany. 5-17-32.

(60) 1,954,964. Device for feeding bar stock to machine tools in which the influence of variations in the length of the bars fed to the machine tool is eliminated. Karl Tessky, Germany. 4-17-34.

(60) 1,856,951. Device for feeding the guide sleeves for spring rings to the points for working. Bernard Foerster, Germany. 5-3-32.

(62) 1,636,406. Stock feed for moving automatically a bar of material through a machine. Lorenz Braren, Germany. 7-19-27.

(62) 1,725,492. Work piece feed of the kind which serves for feeding bar-shaped material. Karl Tessky, Germany. 8-20-29.

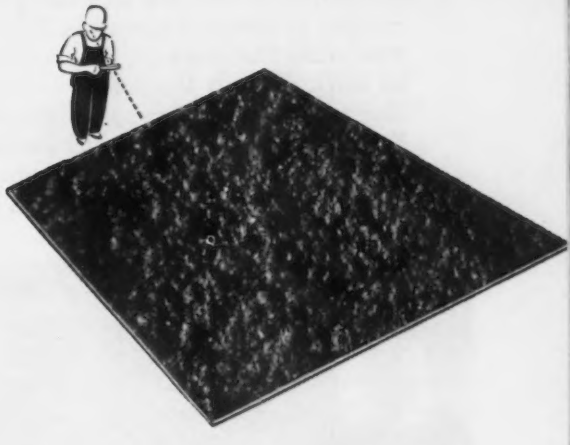
(62) 1,910,574. Machine tool for tooling bar

Why Some Bodies *never* Grow Old

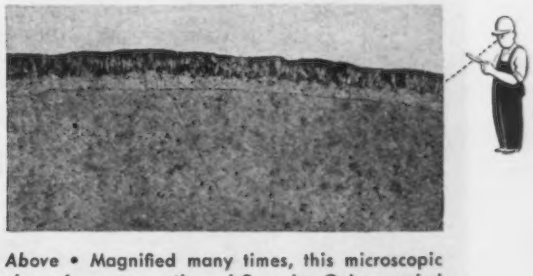
Truck and trailer bodies made of a special steel sheet called Superior Galvannealed have an unusual ability to keep looking young—a trait much appreciated these days. Says one fleet owner, "I've seen these bodies outlast two and three chassis and after a trip to the paint shop look good as new. Those Superior Galvannealed sheets hold paint and don't let rust get a start."

Superior Galvannealed is a well-known example of the ability of SUPERIOR sheets to fit special needs. If you manufacture a sheet metal product that needs a fine and lasting finish, it will pay you to investigate Superior Galvannealed.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.



Above • This microscopic photograph illustrates the "key" or tooth on the surface of Superior Galvannealed steel sheets. A patented heat treating process produces this splendid foundation for taking and holding paint.



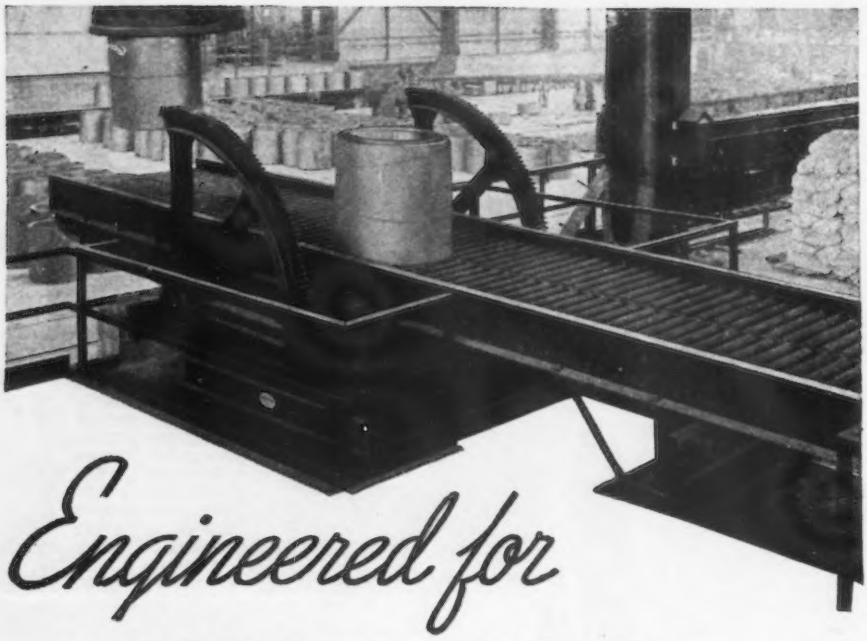
Above • Magnified many times, this microscopic view of a cross section of Superior Galvannealed shows how the coating is bonded to the base sheet by a series of iron-zinc alloys. This protection afforded the base sheet, together with the "toothed" surface, prevents rust from forming under paint or other finish.

Superior Galvannealed
PATENTED PROCESS
TRADE MARK

CONTINENTAL SUPERIOR STEEL

SUPERIOR

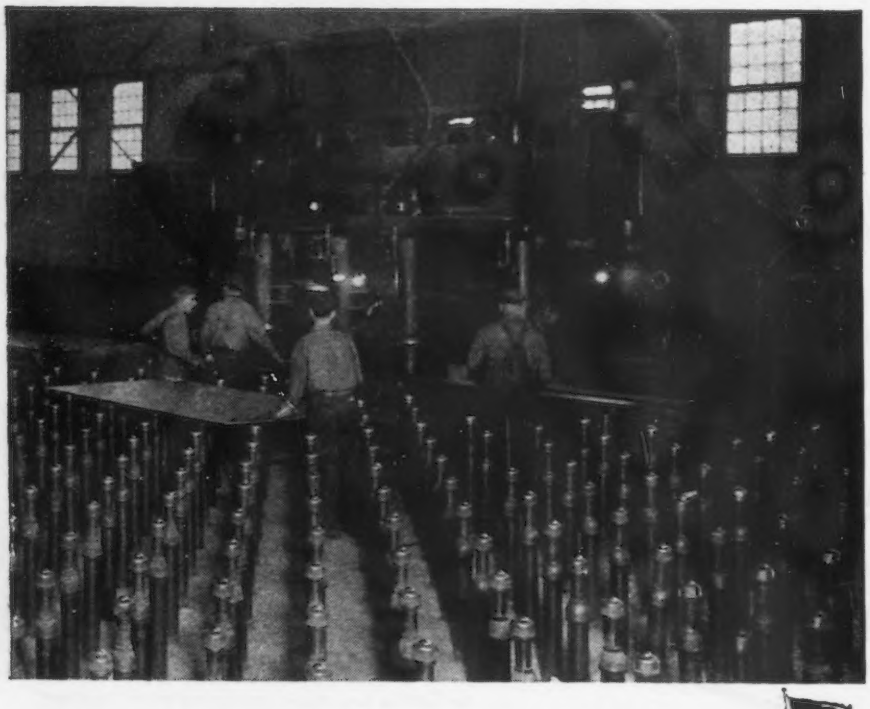
CONTINENTAL STEEL CORPORATION



Engineered for

SEVERE SERVICE

Mathews Conveyers, like all production machinery, have taken a great amount of punishment as America's tremendous industrial effort grew and expanded. In foundries, steel mills, brass and aluminum plants, and our great arsenals, they have been on the job, taking the pounding of greater and greater production of essential materials. These conveyers are still taking it because they were built for severe service. Long experience in working with the heavy industries has taught Mathews Engineers to figure rugged equipment for heavy work. Your Engineer can show you why Mathews Conveyers can serve so long on the most severe conveying job. This service is available in principal cities in the United States and Canada.



Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA

stock. Karl Tessky, Germany. 5-23-33.

(62) **2,167,308.** Machine tool for the periodical machining of bar stock, such as machines for cutting off predetermined lengths from the stock bars, in which several tooling units are provided and all units are under a single control. Eugen Nadelin, Germany. 7-25-39.

(64) **1,667,062.** Automatic control mechanism in which a driving shaft is provided for actuating certain parts, the operative periods of the driven shaft being regulated by a control shaft. Karl Tessky, Germany. 4-24-28.

(69) **1,615,223.** Method of disintegrating or demolishing wrecked ships. Oskar Grumpelt, Germany. 1-25-27.

(69) **1,640,832.** High speed friction saw, in which on the shaft of the driving electromotor a rapidly rotating toothless cutting disk is arranged in such a manner that either the cutting disks can be advanced toward the work piece or vice versa. Adolf Jacobowitz, Germany. 8-30-27.

(69) **1,867,342.** Device for removing rings from swollen or injured fingers. Bruno Wieg, Germany. 7-12-32.

(69) **2,079,974.** Apparatus for cutting into sections of equal length tubes produced by a rolling mill. Rudolf Traut, Germany. 5-11-37.

(73) **2,182,289.** Hydraulically operated hacksaw in which the feed movement of the saw blade which is clamped in a blade frame, is in a direction parallel to itself. Hans Eisenlohr, Germany. 12-5-39.

(76) **1,759,325.** Tool adapted to remove the portion of the welding collar on the side faces of T-rail heads. Friedrich Schmidt, Germany. 5-20-30.

(78) **1,725,686.** Double cut file having intersecting cuts. Hubert Ufer, Germany. 8-20-29.

(78) **2,183,082.** Grinding wheel for soft materials such as leather, soft metal and similar materials. Anton Montagne, Germany. 12-12-39.

Aircraft and Landing Craft Output Gained During February

• • • **February munitions** production, on the whole, showed a marked drop as compared with January, with only the aircraft and landing barge classifications showing a rise. Manpower apparently is the crux of the entire problem and according to WPB Chairman Donald M. Nelson will become a "more and more critical problem."

Airframe weight of aircraft produced during the 29-day month reached the all-time high of 81,400,000 lb., not counting spare parts. The production of heavy bombers, which will spearhead the European invasion, was especially marked. Aircraft alone accounted for 30 per cent of the dollar volume of all munitions produced during the month.

Landing craft production rose 10 per cent, but the recent emphasis on this item undoubtedly caused this rise. Ships, in terms of work done on Army, Navy, and Maritime Commission vessels including repair and maintenance, fell 4 per cent. Guns and fire control were down 1 per cent, combat and motor vehicles production was off 10 per cent, communication and electronic equipment was down 5 per cent, and miscellaneous equipment and supplies were down 3 per cent from January production. Mr. Nelson attributed the drop in combat vehicle production to changes in the design of one of the armored types. Overall munitions output was down 1 per cent during February from January's production.

Douglas Announces DC-7, Oceanic Postwar Transport

Long Beach, Cal.

• • • **Taking the wraps** off of the design of an 86 passenger DC-7, Douglas Aircraft Co. acknowledged this new super-transport. It is Douglas' answer to transoceanic air transport. For cargo use, the plane can be easily converted. To date, there are no completed ships of this model, but a mock-up has been built.

With an estimated cruising range in excess of 4000 miles, at speeds over 400 miles per hr., and a service ceiling of about 40,000 ft., this new ship is regarded by many as the first true over-ocean transport designed for the long ranges required.

The plane will be powered by four engines, probably radial in design and multi-banked to develop an estimated 3000 hp. The pilot inclosures will be in two streamlined "orbs" set into the curve of the nose section instead of the usual inclosures.

Pay Increase for Foundry Workers Is Denied by WLB

Washington

• • • **The WLB in** a decision announced March 27 denied a further increase in the base rate of workers in the Pacific Northwest foundry industry, holding that the requested increase of 8c. per hour asked by the AFL International Molders and Foundry Workers' Union would "start a spiral which might well disrupt the stabilized rate structure of the entire northwest." In some respects the case is parallel to the steel wage case. Nevertheless, the decision in the foundry case by no means is accepted as an index to what action the board may take in the pending USWA proceeding involving a request for a 17c.-per hour wage increase. For one thing the board admittedly is not governed by precedent and the concern it expresses over an inflationary trend in the foundry case may not be shown in the steel case.

There are differences too with respect to the amount of wage increases granted the foundrymen and the steel workers as well as in the base pay, so WLB might fix a line at which the "spiral" would start. The journeymen workers of the foundry union have been granted increases since January, 1941, of more than 23 per cent, their rate of 97½c. having been moved up to $1.20. The steelworkers have been granted two wage increases since April, 1941, amounting to 15 per cent over the January, 1941, base pay.

WORKERS *Need Salt-*

***Supply it*- this easy, simple way for less than 1c a man per week**

This Is What Happens When Sweating Robs the Body of Salt . . .

At hard work on a hot day, a worker can easily throw off several quarts of sweat — sweat that robs his body of vital salt.

Salt is a balance wheel in the human body. It keeps body fluids in equilibrium and gives tone to the blood. When salt is lost the body is dehydrated and the blood thickens. The result is Heat-Fag, lassitude, inalertness. Production suffers, accidents increase, absenteeism is common.

But loss of body fluids causes thirst. Excess water without salt under these conditions, dilutes body fluids and causes heat cramps.

The easy, simple, sanitary way to replace the salt lost through sweat is with Morton's Salt Tablets. It costs less than a cent a man per week to have Morton's Salt Tablets available at every drinking fountain.

Physicians with America's largest manufacturing plants have the figures to show that this cuts down Heat-Fag, heat cramps, heat prostrations. Production stays up. Accidents stay down.

QUICK DISSOLVING
(Less than 30 Seconds)

This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds.

Case of 9000, 10-grain salt tablets - - - - - - $2.60

Salt-Dextrose tablets, case of 9000 - - - - $3.15

MORTON'S Heat-Fag SALT TABLETS

MORTON'S DISPENSERS

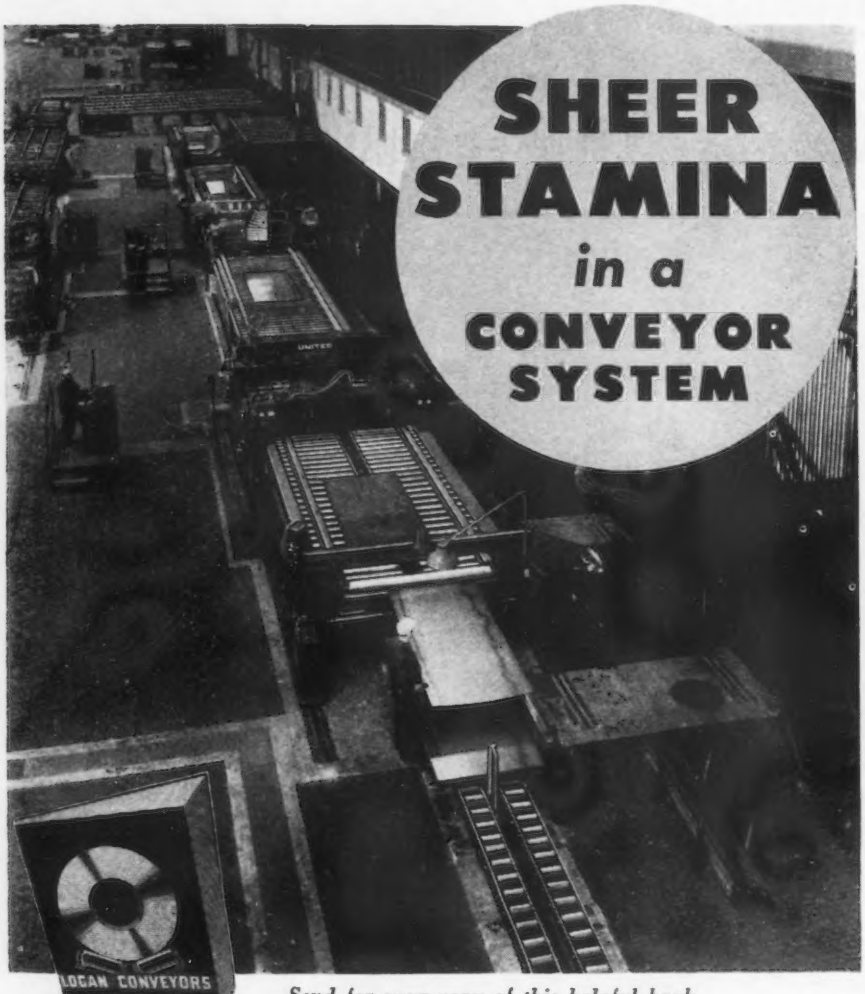
They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable.

800 Tablet size - - - $3.25

Order from your distributor or directly from this advertisement . . . Write for free folder.

MORTON SALT COMPANY, Chicago 4, Ill.

Shearing Lines demand



Send for your copy of this helpful book "Logan Conveyors for the Steel Mill"

Logan Conveyors are *reliable* . . . consider the almost human job done by the Logan equipment in the picture above. The pack tilter facilitates manual transfer of sheets to the entry conveyor serving the roller conveyor at start of shear line.

Live roller units convey sheets automatically through side trimming, intermediate roller levelling, and end shearing operations to piler and runout conveyor.

. . . Yes, Logan equipment speeds material handling every step of the way. It saves money by cutting costs. Write for book "Logan Conveyors for the Steel Mill."

The Logan Co., Inc., 545 Cabel Street, Louisville, Ky.

Logan Conveyors

PUT *FLOW* INTO PRODUCTION

Alcoa Opens Doors

• • • **New Yorkers on March 25 and 26 inspected the Maspeth, Queens, plant of the Aluminum Co. during an Army-Navy open house. Highlights included exhibits of captured equipment, aluminum used in the war and war films.**

Montague Outlines Plan to Prevent Postwar Unemployment

Boston

• • • **Wallace T. Montague,** vice-president of the Norton Co., Worcester, in an address at the first regional meeting of the New England Council's committee for economic development in the postwar period, advocated a five-point program to eliminate unemployment which included: First, early settlement of terminated war contracts; second, disposal of government owned stocks, plants and equipment; third, release of production controls; fourth, revision of the tax policy; and fifth, education for war veterans.

He said that 9000 persons would be unemployed in Worcester after the war unless the city's economic future is carefully planned; that about 81,000 persons would be looking for work, while only 72,000 jobs would be available.

He predicted that when the European war phase is over, cancellation of war contracts in Worcester would throw between 10,000 and 24,000 out of work, but that gradual recovery would be noted in three months.

Russian Orders Hinge On Lend-Lease Extension

Cincinnati

• • • **District machine tool** manufacturers indicate that current new business continues to be satisfactory, when viewed from the standpoint of ordinary peacetimes, but otherwise little or no change in the general market situation. Interest continues to be focused on Congressional action on the lend-lease bill, since a substantial amount of Russian machine tool business is reported to be in the offing, if lend-lease is extended. Current business is largely from various domestic sources, and little or no foreign business is reported to be coming in. Production is still close to capacity on present labor forces, but this brings the market average below the peaks reached in the past year.

Only nine lives? Phooey!

Nine lives are *nothing* to Harcote. For there's no limit to the number of times Harcote can give new life to wearing parts. And now, with repair parts so difficult to obtain, Harcote is doing it every day, as the No. 1 best bet to keep machines on the job, producing for Victory.

For hard-surfacing parts subject to wear and abrasion, Harcote is the ideal electrode. Its deposited metal has moderate work-hardening properties and "as welded" has a hardness of approximately 50 Rockwell "C".

Use Harcote for welding on carbon steel, low alloy and high manganese surfaces. See your P&H representative for information and procedures, or write us.

P&H ALLOY ELECTRODES

The P&H line of Alloy Electrodes is complete. It covers all needs for hard surfacing, resistance to wear, impact and abrasion, for welding stainless steels, 4-6% chrome steels, armor plate, etc. Send for literature.

P&H also builds a complete line of A.C. and D.C. Arc Welders. Write for full information. Early deliveries possible.

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THE BEGINNER, like the veteran, merely peels off the .003 or .002-inch thick laminations to make the required accurate fit . . . A Laminum shim places precision in any man's hands!

Shims cut to your specifications. Stock shim materials obtainable from your dealer. Write us for further information and shim application chart.

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THE SOLID SHIM THAT *peels* FOR ADJUSTMENT

WPB Halts Removal Of New Auto Parts

Washington

• • • **To halt** "cannibalization" of new vehicles held for rationing, WPB ordered that no part of accessory that would impair operating efficiency of such vehicles shall be removed. This action is covered in an amendment to conservation order M-26-b, which governs the handling and storage of new vehicles. Additional regulations extend the provisions of the amended order to cover all reserve vehicles in this country and the territories and insular possessions of the United States.

Another new provision prohibits, after April 15, 1944, conversion of any medium truck chassis to bus use, or the conversion of any medium bus chassis for truck use. This action was included to prevent unbalancing of the current truck and bus production program, which has been scheduled to provide for a specified quantity of each type of vehicle.

CMP Capital Addition Labor Costs Defined

Washington

• • • **Rules governing** minor capital additions made under CMP Regulation No. 5 have been clarified to point out specifically what labor costs may be excluded in determining the value of the addition, the WPB announced. Labor costs that may be disregarded for the purposes of the $500 limit established by the regulation are funds paid for: 1—The services of the purchasers' own regular employees, 2—additional employees that are hired for doing construction or installation work, and 3—fees to independent contractors who install equipment or do construction work where, under normal business practices, the fee is paid primarily for services as distinct from materials. The clarification was made in Interpretation 11 to CMP Regulation No. 5.

Consumer Goods Production Being Expanded in Canada

Ottawa

• • • **Control regulations** in Canada for the production of consumer goods are steadily being lifted. The Wartime Prices and Trade Board announced that some electric stoves, rangettes, and grills will be available this year, but the total number available will not be large.

minutes

VITAL IN WAR . . . VALUABLE IN PEACE

NO postwar job will ever compare with the urgency of wartime production. For while the war is on, a minute saved may mean a life saved, too.

Yet minutes will still be valuable when peace returns. To save a minute is always to cut a cost. And it is the low-cost producer who will be most successful in the competitive postwar field.

Acme can save you minutes—wartime minutes and peacetime minutes as well. If you need new dies, patterns, heat-treated aluminum castings, Acme can supply them. Should your present or postwar production require special tools, Acme can both design and build them.

Acme consulting engineers have helped many a wartime producer to conquer production line problems. These same engineers will be equally helpful during the critical transition from war to peace.

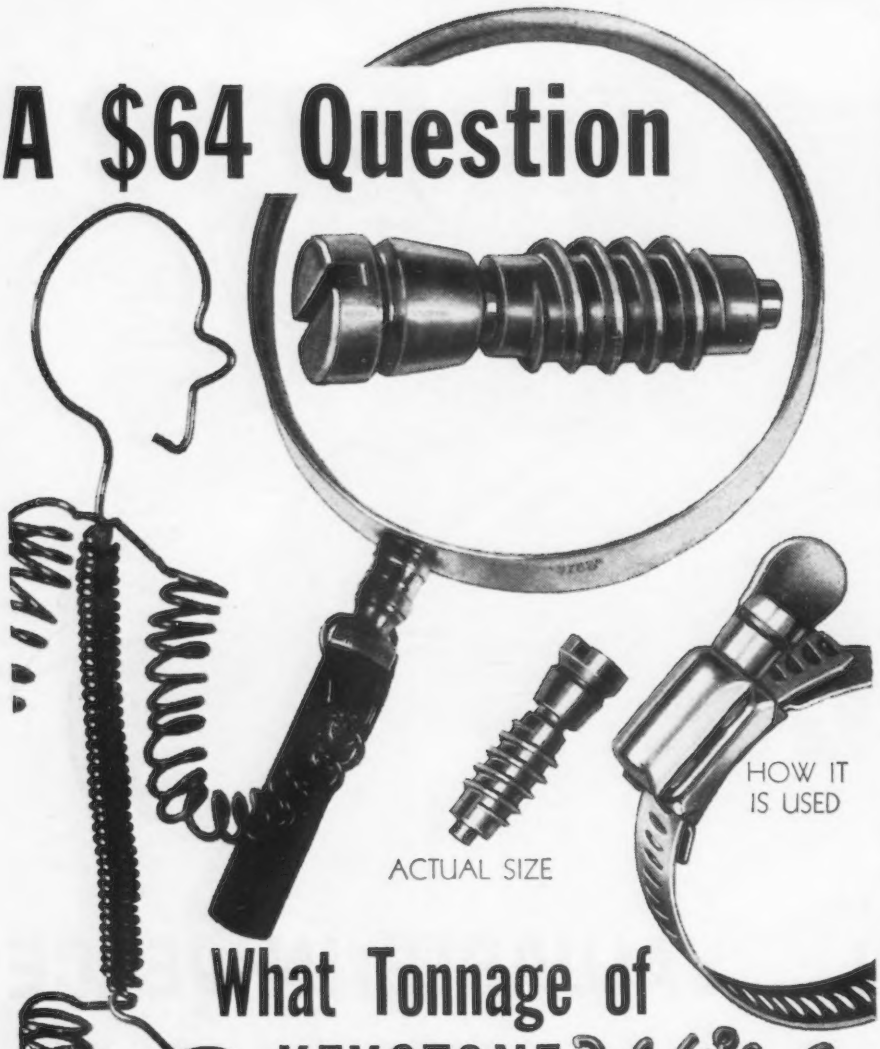
Preliminary recommendations submitted without obligation.

ACME *Pattern and Tool Company, Inc.*
DAYTON, OHIO

FOR VICTORY
BUY
WAR BONDS
AND STAMPS

HEAT-TREATED ALUMINUM CASTINGS...PATTERNS...TOOLS...TOOL DESIGNING...PRODUCTION PROCESSING

A $64 Question



What Tonnage of KEYSTONE *Wire*

is used each month in fabricating this tiny airplane hose clamp screw?

Answer: approximately *300 tons* of special Keystone Wire is being used monthly for just this one tiny (but vital) item. Then consider the thousands of other war uses for wire—many of which require *tremendous* tonnages—and you have the answer why most of Keystone's industrial wire production is being "called to arms."

But while on this industrial march to Victory, significant developments in wire performance are being made—new techniques that will help many enterprising manufacturers attain leading positions in the postwar civilian market.

KEYSTONE STEEL & WIRE CO., Peoria, Ill.

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Continuing the march toward Victory depends on MORE SCRAP!

U. S. to Supply Chile For Rail Expansion

Santiago, Chile

• • • **Railroad construction** and expansion plans are going ahead here, with the government planning to spend about $15,000,000 on the project. Nearly two-thirds of this sum will be spent in the United States for materials and equipment, according to Abraham Alcaino, minister of public works and communications.

Arrangements for financing the project have been completed and the Chilean State Railways has been authorized to let bids in the United States for the purchase of nearly $10,000,000 worth of electric locomotives, cables, cars, transformers and other machinery and equipment. The balance of the funds will be used for construction in adapting present steam lines to electric service, reinforcing bridges, installing new signal systems and making other improvements.

Bids are being let for 250,000 tons of steel rail to be used in completing the Chilean section of the international railway connecting Chile with Argentina. Purchase of six new automotors, 1000 freight cars and other equipment for three other railroads already has been authorized entailing an expenditure of $5,000,000.

Plans are being made for building by 1946 a double track subway in Santiago, cost of which is roughly estimated at $6,000,000.

Aluminum Use Approved In Food Processing Machinery

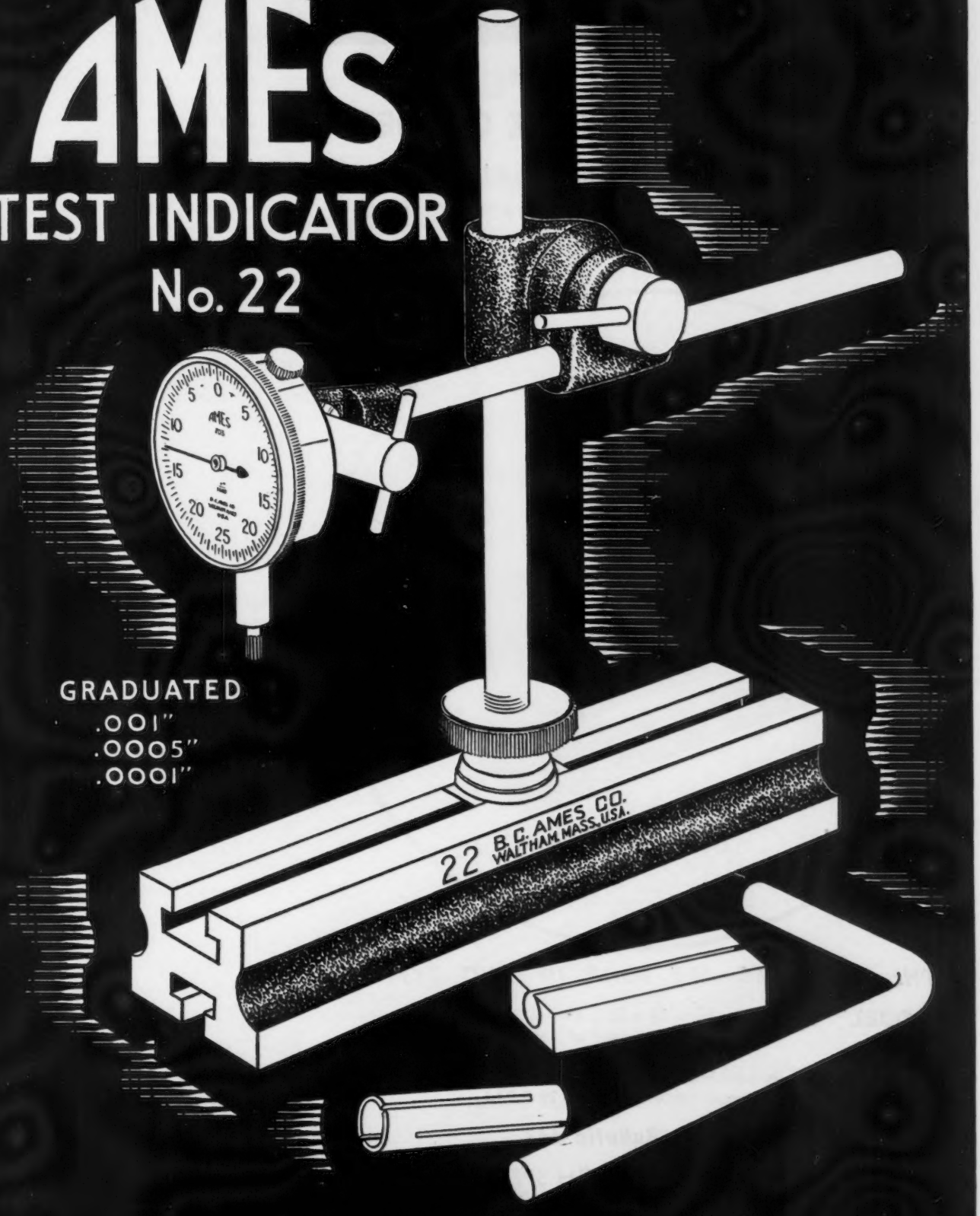
Washington

• • • **To improve the** performance of food processing machinery and equipment, restrictions covering certain limited uses of aluminum in these products has been lifted. The WPB reported, estimating that 13,000 lb. of the metal per quarter would be released to fill requirements.

Other metals in short supply, such as copper, copper base alloys, tin, chromium, alloy steel, etc., will continue to be restricted except when employed in contact points or corrosion parts.

In a release dated March 14, 1944 (WPB-5186) it was erroneously stated that restrictions had been lifted on copper, and copper base alloys, for use in this type of machinery and equipment.

AMES
TEST INDICATOR
No. 22



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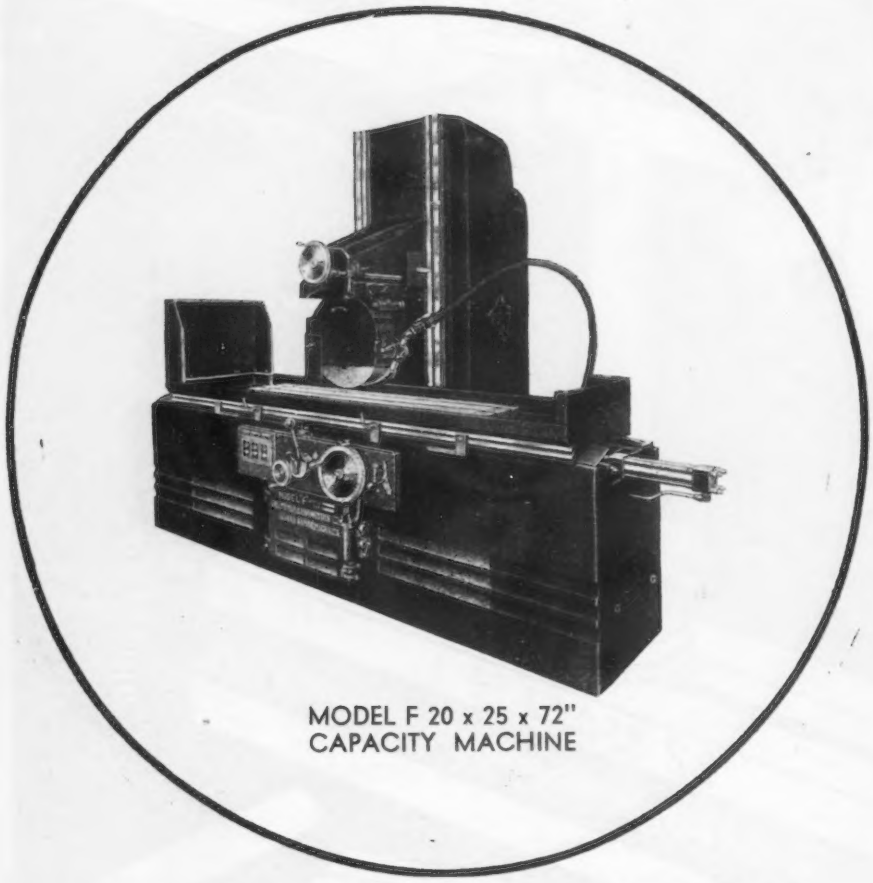
PRODUCTION TYPE HYDRAULIC FEED SURFACE GRINDERS

are meeting the most exacting needs of Army, Navy and Air Corps contractors requiring maximum production in surface grinding.



MODEL F 20 x 25 x 72" CAPACITY MACHINE

THE MACHINES ARE BUILT IN TWO TYPES:

MODEL "F" in sizes from 16 x 25 x 48" to 20 x 25 x 72", with maximum table speed of 150 F.P.M.

MODEL "A" in sizes from 12 x 18 x 36" to 14 x 18 x 72" with maximum table speed of 125 F.P.M.

Send for Bulletin 443

IF INTERESTED IN MODERN HIGH SPEED SURFACE GRINDING

GALLMEYER & LIVINGSTON CO.

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GRAND RAPIDS 4 MICHIGAN

Founders Discuss Postwar Markets

Boston

• • • **Postwar outlook** for the gray iron foundry business was outlined recently by H. B. McCoy, chief, Division of Industrial Economy, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, at the New England management-marketing conference of the Gray Iron Founders' Society in Boston. Saying that he was giving a "background against which you may project your own ideas, information and experience for the purpose of arriving at your future policies and your planning therefor," McCoy told the founders that although the amount of gray iron castings consumed in the machine tool industry will continue to drop even more after the war, "such fields as the diesel engine, building and construction, utilities, railroad equipment, electrical industries and a large number of other miscellaneous industries are fruitful fields for investigation.

"The principal task of industry management will be to sell the output of the factories," he said. "In my opinion," he continued, "industrial research, both in the factory and in the selling organization will be more important than it has ever been before. Producers simply cannot rest on their laurels; there must be constant searching for better and more efficient methods of production, technological research and a quest for new outlets."

Inland Develops New Type Concrete Reinforcing Bar

Chicago

• • • **Inland Steel** Co., Chicago, has announced a new type of concrete reinforcing bar, called Inland Hi-Bond. The company claims the bar represents the first real improvement in the bonding value of concrete reinforcing bars in more than 30 years.

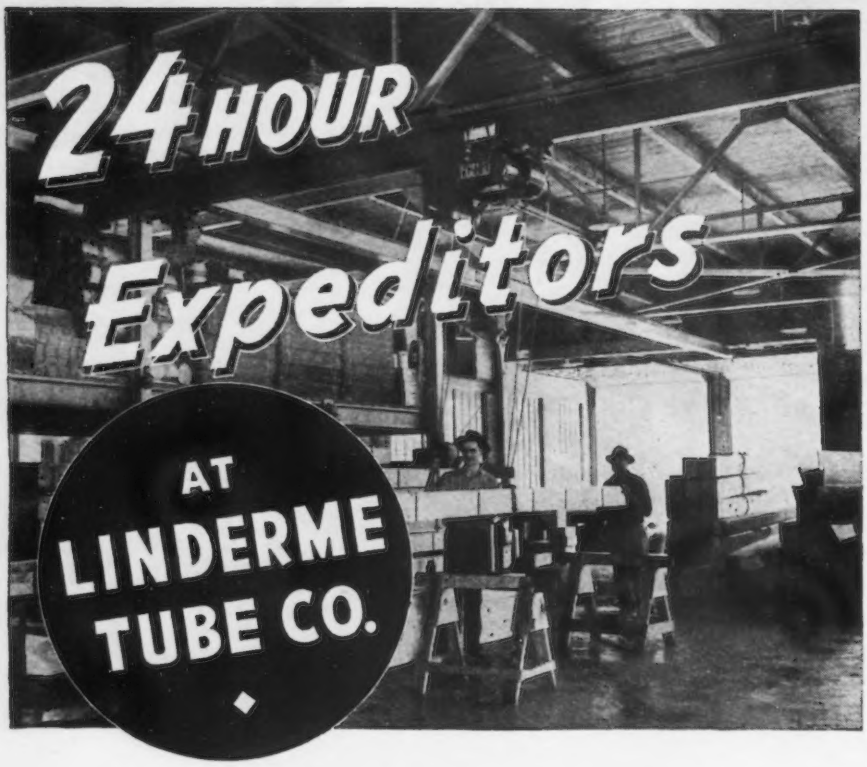
Improved load transfer is accomplished by means of reversed double helical ribs of proper height, which extend between diametrically opposed longitudinal ribs. The helical ribs are spaced at close intervals and so dimensioned as to provide potential bearing and shearing areas, which, in addition to having the proper relationship to each other, are properly proportioned to the effective strength of the bar. The bearing area is more than double that of usual commercial types of reinforcing bars.

They <u>both</u> need protection! . . . It's a big responsibility—supplying protection to floors as well as trained personnel. "A.W." Rolled Steel Floor Plate makes floors rugged, permanently safe—despite hours of punishing wear. No worn or slippery surfaces to endanger men on foot. Shown above is the "A.W." Super-Diamond Pattern which resists slipping in *any* direction. Plate can be cut and installed almost overnight without disturbing production. Write for folder.

Other products include Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives, Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal



Mile after mile of seamless copper, brass and aluminum tubing daily speeds into the production battle from the Linderme Tube Co. plant at Cleveland, Ohio.

Six strategically located EUCLID HOISTS expedite manufacturing, handling and shipping operations here. They work continuously, 6 and 7 days weekly requiring very minor maintenance and no major repairs whatever!

EUCLID features, which contribute to many amazing performance records, include: liberally proportioned parts throughout, the best type of anti-friction bearings, advanced methods of lubrication and quick easy facilities for inspection, adjustment and repairs.

These features combine to afford a long life of trouble-free service as evidenced by the impressive number of prominent industrial concerns who have standardized on EUCLID HOISTS.

THE EUCLID CRANE & HOIST CO.
1361 Chardon Rd., Euclid, Ohio

★ WE CAN DELIVER A LIMITED NUMBER OF 5 to 10 TON CRANES in 60 to 90 Days

Wire Association Elects New President

New York

• • • **At the annual** meeting of directors of the Wire Association at the Waldorf-Astoria Hotel, New York, on March 24, the following officers were elected for the ensuing year: President, D. D. Buchanan, manager of operations, Union Drawn Steel Division, Republic Steel Corp., Massillon, Ohio; Vice-President, R. M. Hussey, supt. wire dept., Jones & Laughlin Steel Corp., Aliquippa, Pa.; Vice-President, Non-Ferrous Division, E. W. Gundstrom, asst. plant manager, Rome Cable Co., Rome, N. Y.; Executive Secretary, R. E. Brown, Wire & Wire Products, 300 Main Street, Stamford, Conn. New Directors seated at the meeting were: Kenneth H. Davis, president, K. H. Davis Wire & Cable Co., Los Angeles, and Flint C. Elder, special research engr., American Steel and Wire Co., Cleveland.

•

Fan Makers Elect Officers

New York

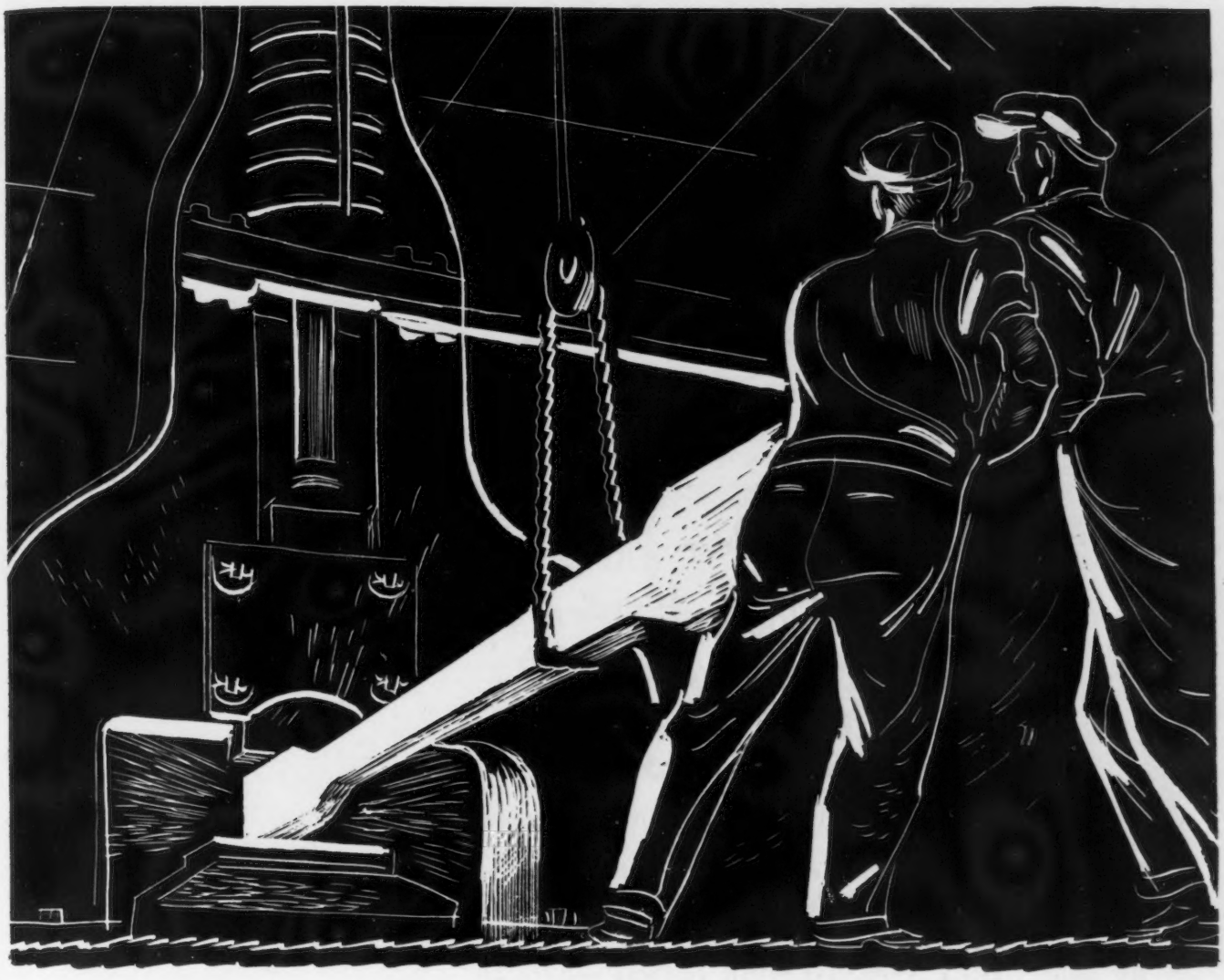
• • • **The Propeller** Fan Manufacturers Association elected officers at its annual meeting held in New York. E. C. Englert was elected president, Wallace Allen, vice-president, and V. C. Shetler, secretary and treasurer.

Nut, Bolt and Rivet Institute Releases New House Organ

Cleveland

• • • **"Fasteners," a new** house publication for the American Institute of Bolt, Nut and Rivet Manufacturers that has been in preparation for several months, reached the distribution stage this week. The publication is pointed at design engineers and operating executives in the various manufacturing fields that have problems in joining or fastening metal and metal products. The technical discussions and articles in the publication deal exclusively with bolt, rivet, screw, and other mechanical fasteners and their applications.

Announced in the first issue of "Fasteners" by Herman H. Lind, president of the association, is a program of technical research that is underway at the Technological Institute of Northwestern University. Problems brought to the institute by users of fasteners are either answered by the technical staff or referred to manufacturers.



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Skill, long experience (148 years) and constant supervision by trained metallurgists, from acid open hearth to finished forging, give Standard Steel Forgings and Castings a dependable long service life span. Quality is the watchword of Standard production and this is borne out by the record over the years. The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. OFFICES: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Houston.

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STEEL FORGINGS & CASTINGS

You Could Put Up WARNING SIGNS..

But a Much Better Way to Prevent Costly Accidents is to Keep Floors SAFE with

Carey ASBESTO-SORB

Wartime is NO time for accidents. Every man-hour lost is the enemy's gain.

Oily-grease-covered floors are constant accident hazards. Workers may easily slip and fall . . . serious injuries may result, costly in time, money, and lowered output. And there's the ever-present danger of fire.

By using CAREY ASBESTO-SORB you can reduce all these hazards to a minimum, thereby safeguarding your workers.

ASBESTO-SORB is the super-efficient, economical product that keeps floors dry and SAFE—free from dangerous oil and grease. A trial will convince you. Send TODAY for information and sample for making your own test. Address Dept. 26.

—THE ASBESTOS OIL and GREASE ABSORBENT

CAREY ASBESTO-SORB has an *affinity* for oil and grease. Oily deposits are instantly absorbed . . . so quickly and easily it seems like magic! Floors are left clean, dry, non-skid—SAFE.

ASBESTO-SORB is non-inflammable, and harmless to floors, hands, shoes, clothing. Economical—can be used over and over again. Quickly spread by hand, easily swept up.

ASBESTO-SORB may also be spread as a cushioning floor mat. Doesn't "ball up" and is not tracked around the plant.

FIRE SAFE!

ASBESTO-SORB will not burn. Rated "Class I, Non-Combustible" by Underwriters Laboratories, Inc.—another quality important to you and the war effort.

THE PHILIP CAREY MANUFACTURING COMPANY, Lockland, Cincinnati, Ohio
Dependable Products Since 1873.
***In Canada:* The Philip Carey Co., Ltd., *Office and Factory:* Lennoxville, P. Q.**

Army Needs Auditors For Renegotiation

• • • **To help speed** the settlement of terminated war contracts, the Army is seeking the aid of approximately 1000 accountants and auditors, the War Department announced. The cooperation of industry is asked to insure the employment of qualified personnel. Some of those employed will also work on expediting contract renegotiation. Employment will be nationwide and not concentrated in Washington, D. C.

The Army Service Forces will utilize the Officer Procurement Service to obtain this personnel who will serve in civilian capacity under Civil Service. Actual employment will be done by the Technical Services of ASF through the Industrial Personnel Division, ASF, after obtaining certification by the Civil Service Commission. Salaries range from $3268 to $6228 per year.

Correction Made in Surplus Disposal Office Address

• • • **In the March 30** issue on page 92—under the heading of "Government's Surplus Disposal Offices over the Nation Listed," Region I, WPB reference should be corrected to read as follows:

Facilities Department
Redistribution Section
17 Court Street, Boston 8
Telephone: Lafayette 7500
Att: Harvey E. Durkee
Regional Manager

COMING EVENTS

April 5-7—SAE National Aeronautic Meeting, New York.

April 12-15 — The Electrochemical Society, Inc., Milwaukee.

April 17, 18—American Zinc Institute, Galvanizing Committee, St. Louis.

April 25-28—American Foundrymen's Association, Buffalo.

May 1, 2—Westinghouse Machine Tool Electrification Forum, Pittsburgh.

May 8—Association of Iron & Steel Engineers, spring conference, rolling mill committee, Pittsburgh.

May 9, 10—American Steel Warehouse Association, Inc., Chicago.

May 22-24—American Gear Manufacturers Association, Rye, N. Y.

May 25—American Iron and Steel Institute, New York.

June 5-7—SAE National War Materiel Meeting, Detroit.

Retracting and Repositioning Work Within .0002 OF AN INCH—By Push Button

The most frequently needed function in a precision boring machine is that of retracting the work to facilitate measuring and tool setting.

In the DeVlieg Jigmil, this function is automatic—by fingertip control. Operation of a push button unlocks the table and moves it by rapid traverse to the desired position for measuring. For repositioning, operation of a single push button will cause the table to return to its cutting position by rapid traverse, stopping and locking automatically. Uniformity of selected position for stopping and locking is dependable within .0002".

The DeVlieg Jigmill is a new type machine—has the spacing accuracy of a Jig Borer — Performance Qualities of a Milling Machine—Convenience and Flexibility of a Horizontal Boring Mill. All control is so centered and organized that the operator never has to take his eyes off the work.

Thus, the Jigmil fulfills the machine tool ideal—a powerful and accurate extension of the operator's hand.

Many machines show 75 per cent greater average daily productivity.

DE VLIEG MACHINE COMPANY
450 FAIR AVE. FERNDALE (DETROIT) MICHIGAN

Write for Circular

DEVLIEG MACHINE TOOLS

140 Examples from War Production — in Delta's New 76-page BLUE BOOK

Ingenious combinations of low-cost stock-model Delta tools — devised by production men in America's leading war plants — have written a new chapter in modern tooling practice. • Special-purpose machines, increasing production 200% to 600%, have been built at a fraction of the cost and in a fraction of the time ordinarily involved. This minimum capital investment, moreover, is flexible — being composed chiefly of standard elements which are readily convertible. • This new free book pictures and describes a wide range of applications — actual, detailed case histories which give your production men a running start on your own special problems in working metals, wood, or plastics. Break your war-production bottlenecks — plan for an edge in post-war competition — with these modern methods. Write for free copy of the Blue Book. MA-6

Tear out and mail this coupon today

DELTA
MILWAUKEE
Machine Tools

THE DELTA MANUFACTURING CO.
705D E. Vienna Ave., Milwaukee 1, Wisconsin

Please send my free copy of your new 76-page Blue Book, and catalog of low-cost Delta tools.

Name..... Position.....

Company.....

Address.....

City..... (.....) State.....

Check List For War Adjustment Now

(CONTINUED FROM PAGE 95)

F. Purchasing conversion.

1. List the materials needed for the production conversion which are not available within the company.

2. Make tentative arrangements for supplying those needed materials.

3. Make sure that your control system will keep you informed of any change in requirements or in materials available within your company.

4. Keep informed of the development of new products and materials and call them to the attention of other departments of your business.

5. See that the person in charge of quality testing of supplies is prepared to report on new materials.

6. Consider in cooperation with other departments, especially sales and production, whether to continue present subcontracting arrangements.

7. Re-establish contacts which may have lapsed because of the war.

8. Pass along to suppliers and potential suppliers information about the company's intentions; cooperate with the salesmen of other companies who are in a position to keep you informed.

9. If you are in charge of the company's salvage program re-examine your program in the light of probable changes in value when primary materials become more easily available.

G. Accounting and other management controls.

1. Be sure your records are in order, especially if you have war contracts or subcontracts.

2. Examine your records to see whether they give you necessary information for making sound management decisions, especially with reference to cost, selling price, and the proper basis for selecting which of several suggested products you should manufacture or distribute.

3. Re-examine your inventory controls.

a. Hold inventories down to contract requirements, avoiding accumulation of any excess.

b. So far as possible, avoid accumulation of "ersatz" materials.

c. Make plans for eventual liquidation of inventories which you cannot use in your business after war-production stops. Investigate the redistribution service of WPB.

H. Research.

1. All areas of conversion may require research to help develop the right answers. This is most obvious in production, new products, and marketing but might be equally true in personnel or accounting.

2. Materials for developmental work are becoming more easily obtainable.

Cellophane Bags for Aircraft Rivets

(CONTINUED FROM PAGE 59)

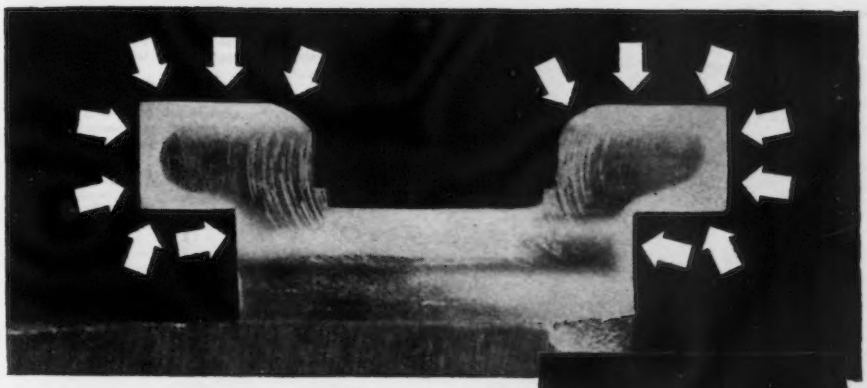
idea of packaging rivets several months ago to prevent rivets from being scattered over factory floors. However, it soon developed that cellophane packaged rivets served another equally important purpose, that of keeping rivets cool, and now many aircraft companies use this packaging method.

A large proportion of rivets used in military aircraft are made from 17S aluminum alloy, and rivets made from this material must be kept cold until used; otherwise, they age harden and crack when headed. During the manufacturing process rivets are heat treated and must be quenched in a cold water bath within 10 sec. after leaving the furnace. This "freezes" the copper-aluminum which has been dispersed uniformly throughout the rivet when it is subjected to a temperature of 935 deg. F. for 45 min. At room temperatures, the copper aluminum precipitates out in minute particles and becomes a hardening agent, making the rivet nearly three times stronger in shear and tensile strength. To prevent the hardening process from occurring before the rivets are used, they are placed in refrigeration, and this is where cellophane envelopes have proven so valuable.

Prior to use of packaged rivets, workmen obtained small cups filled with rivets from central refrigerators, and when these rivets were exposed to open air and room temperatures, they became hard within 30 min. This meant that every 30 min., riveters had to replenish their supply. Manhours lost in this process were enormous, and it was found that due to the insulating effect of cellophane, "ice-box" rivets could be kept by riveters three times longer before returning them for reprocessing. With hundreds of riveters having to make fewer trips to refrigerators, the total savings in the San Diego plants amount to several hundred thousand dollars a year.

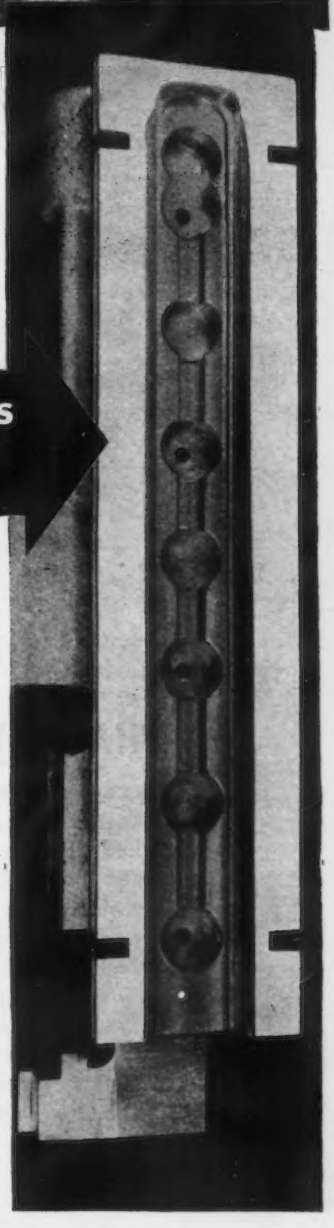
Chicago Expansions Rise

• • • **Additions to** industrial facilities in the Chicago area undertaken since June 1940, climbed over the billion dollar mark last month. Additions since the defense program started now stand at $1,010,659,687, with the March figure standing at $14,123,750.



Bearing surfaces of wear-resisting Ampco Metal cost less..

-with welded overlays of Ampco-Trode



Welding—the fabricating method which has made such tremendous strides in war production—offers you an economical means of building up surfaces that resist wear, shock, and corrosion.

With Ampco-Trode, you can overlay less costly base metals with the same high-quality aluminum bronze which has found such wide acceptance in the form of castings and wrought products as Ampco Metal. Any grade of Ampco-Trode—selected for your required physical properties—can be welded to almost all metals and their alloys.

From giant marine propellers to the smaller machine parts or valve seats, you can apply aluminum bronze where needed. (Illustrated: gun slide overlaid with Ampco-Trode on bearing surfaces.)

Your questions on specific applications will be gladly answered by the nearest Ampco field engineer. Don't delay—call or write today.

Write for Ampco-Trode catalog.

W-1

Tear out and mail coupon today!

Reg. U. S. Pat. Off.

AMPCO METALLURGICAL SPECIALTIES

Ampco Grades, 12 to 22 (special alloys of the aluminum bronze class) . . Ampcoloy (general industrial bronzes) . . Special Custom Copper base alloys.

AMPCO Metal

The Metal without an Equal

Sand Castings..Centrifugal Castings . . Extruded and other Wrought Products.. Precision - machined Parts .Ampco-Trode (coated welding electrode)..Ampco Non-Sparking Safety Tools

Ampco Metal, Inc., Dept. IA-4
Milwaukee 4, Wis.

Please send Ampco-Trode Bulletin with information on wear-resisting welded overlays of Ampco Metal.

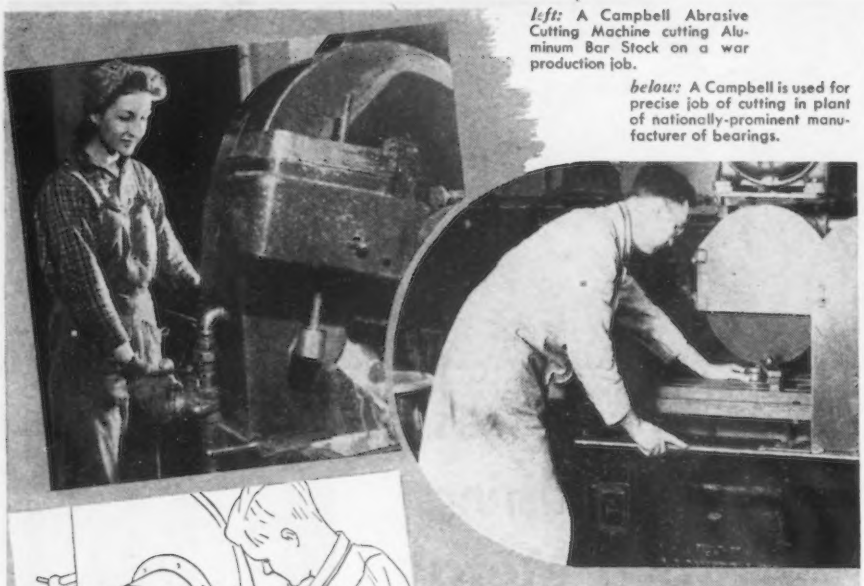
Name_____

Position_____

Company_____

Address_____

City_____ State_____



left: A Campbell Abrasive Cutting Machine cutting Aluminum Bar Stock on a war production job.

below: A Campbell is used for precise job of cutting in plant of nationally-prominent manufacturer of bearings.

above: Campbell speeds up an important tube cutting job in an aircraft factory on the Pacific Coast.

above: Precision set-up in a manually operated Campbell Abrasive Cutting Machine in a war production plant.

WHAT IS *YOUR* CUTTING JOB?

These 4 **CAMPBELL ABRASIVE CUTTING MACHINES** are all different. Each is cutting different stock to different dimensions—none limited to the job it is doing.

CAMPBELL has the only complete range of Abrasive Cutting Machines—cutting annealed and unannealed steels, non-ferrous alloys, plastics, glass and ceramics—solid bar, tubular and flat stock.

What are you cutting? Can **CAMPBELL** give you a procedure that will do the work better, make it easier to meet schedules and lower costs?

You can find that out by writing the Andrew C. Campbell Division. State what material you are cutting, length of pieces before cutting, length of cut-off pieces and production required per hour.

Campbell

ABRASIVE CUTTING MACHINES

ANDREW C. CAMPBELL DIVISION

BRIDGEPORT • CONNECTICUT

ALSO MAKERS OF A COMPLETE LINE OF NIBBLING MACHINES

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

Tool Engineers Meet

(CONCLUDED FROM PAGE 63)

power, Mr. Weddell presented the following simple formulas:

$$\text{Metal removed in cu. in. per min.} = \frac{\text{horsepower available}}{2^*}$$

$$\text{Feed, in. per min.} = \frac{\text{cu. in. per min.}}{\text{depth x width of cut}}$$

$$\text{Approx. r.p.m.} = \frac{\text{cutter diam. x cutting speed}}{4}$$

$$\text{Chip load} = \frac{\text{feed, in. per min.}}{\text{No. of blades x r.p.m.}}$$

or

$$\text{No. of blades in cutter} = \frac{\text{feed, in. per min.}}{\text{chip load x r.p.m.}}$$

*Based on 2 hp. to remove 1 cu. in. of mild steel. Other factors: Cast iron 1; alloy steel 3 and aluminum 1/3.

The speaker suggested the following cutting speeds for carbide tipped cutters:

Material	Speed, ft. per min.
Cast iron	200
Mild steel, malleable iron and brass	300-800
Alloy steel	150-250
Aluminum, copper	1500 or more

Chip load per tooth should be from 0.005 to 0.010 in. for medium duty cuts, ¼ in. deep; 0.008 to 0.012 in. for heavy cuts, ½ in. deep and from 0.012 to 0.020 for extra heavy cuts.

The speaker exhibited solid type fly cutters made of cast Meehanite and also a variety of inserted blade types. One form, developed by Mr. Weddell, uses a carbide tipped bit of triangular section which is held in the cutter body by a set screw and a back up screw. With a two-bladed cutter body one blade can be set up to take a roughing cut and the other a finishing cut, or step milling can be employed to split the depth of cut rather than the chip load. The speaker strongly urged the use of flywheels on the spindle to dampen vibration caused by intermittent cutting and to increase momentarily the available power.

Price Briefs

● **Auto parts**—Method for pricing rebuilt automotive parts other than rebuilt motors designed to bring out a supply of replacement parts critically needed to maintain essential civilian transportation. Amdt. 4 to MPR 452. (Release No. OPA-T-1851)

●

● **Consumer goods, used**—Adjustments are permitted when the retail seller of reconditioned or rebuilt articles covered in MPR 429 is not himself the reconditioner. Amdt. 2 to MPR 429.

●

● **Machines, industrial**—Sellers whose costs have increased because suppliers' prices have been raised under the automatic adjustment provision may apply to the OPA for permission to pass on the resulting increase when the article is sold to another buyer. Amdt. 112 to MPR 136. (Release No. OPA-T-1858)

Priority Changes

Aluminum—Additional uses of aluminum for products essential to the war effort have been allowed extending to all products and equipment for the military services when the government specifications call for it. M-1-i as amended. (3-23-44)

Appliances, electric—Control over electric heating pads has been shifted to order L-65. L-84 revoked. (3-24-44)

Castings, malleable iron—Inventories have been limited to a 45-day supply. M-21-i. (3-21-44)

Chromium—Amount of chromium metal exempt from restrictions has been reduced from 1000 to 250 lb. M-18-a-1 (3-25-44)

Chuck gages—Exact definition has been issued to remove any doubt as to the type of equipment meant. L-270 as amended (3-22-44)

Construction—Limitations will be imposed on some types of portable structures. Int. 4 of L-41. (3-24-44)

Doors, metal—Restrictions eased on the weight of metal permitted in metal doors used for fire protection. L-142 as amended. (3-25-44)

Escalators—Added control has been placed over production of escalators, and manufacture of this type of equipment is prohibited. L-89 as amended (3-23-44)

Farm implements—All preference rating requirements for the purchase of atomizing hand sprayers, hand dusters, wheel-type hand cultivators, and hand plows have been lifted. L-257 as amended. (3-23-44)

Flatware, stainless — Manufacturers have been granted permission to use chromium stainless steel other than that obtainable from distressed stocks in making knives, forks, and spoons for specified institutional users of flatware. L-140-b as amended (3-21-44)

Furnaces, casings—Unrestricted use of inner liners for furnace casings is now permitted. L-22 as amended. (3-25-44)

Furniture, office—Iron and steel may be used to produce metal visible reference panels for general office and industrial use to the extent of 40 per cent of the amount consumed for the same purpose in the year ended June 30, 1941. L-13-a as amended. (3-24-44)

Lubrication equipment—Restrictions on sizes and models of such equipment that may be produced have been lifted and a new schedule of prohibited items shown. L-312 as amended (3-24-44)

Machinery, used—Henceforth OPA will have authority to require dealer of used machinery and equipment to file reports regarding prices, inventories, etc. Directive 35. (3-25-44)

Pliers—Manufacturers of permitted types of wrenches or pliers and nippers may make them out of carbon or alloy steel, except where alloy steel only is specified, but must not make the same type in both carbon and alloy steel. Sched. II and Sched. III as amended to L-216. (3-23-44)

Preference ratings—Authority of the Army and Navy Munitions Board to assign preference ratings has been defined. Directive 31, revised. (3-25-44)

Preference ratings—Basic rules governing the use of preference ratings have been revised to bring them up to date and make certain operating changes. PR 1 as amended (3-22-44)

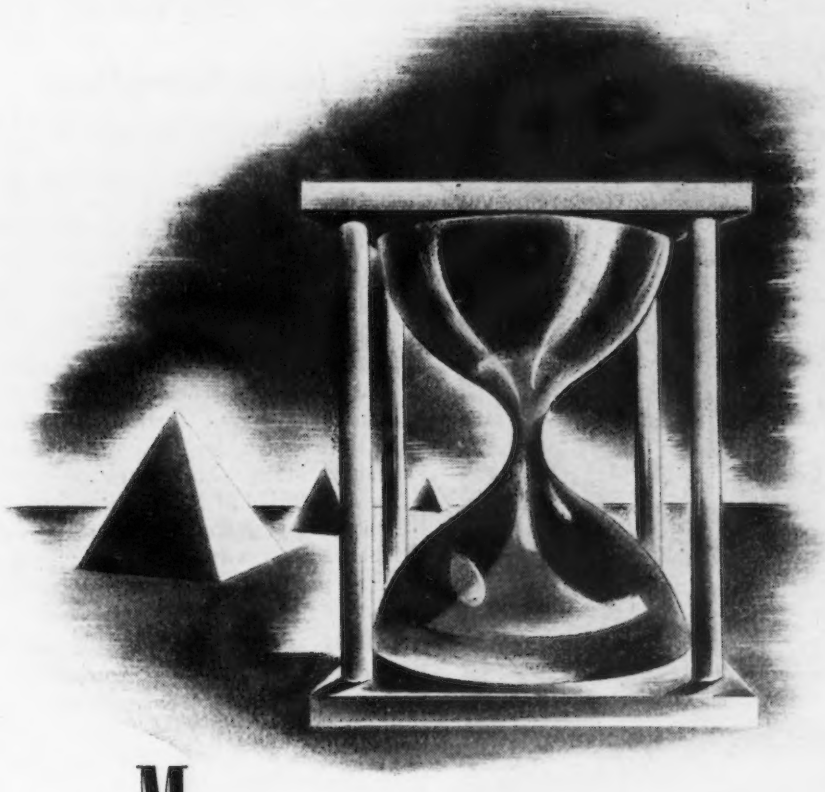
Scales—Simplification schedules for motor truck, portable beam, and built-in-floor scales and baby-weighing scales have been revised to permit the use of metal where formerly only wood was permitted. L-190 as amended (3-23-44)

Scheduling—List of provisions of various WPB orders with which producers of products covered by M-293 did not need to comply has been revoked. Table 2, M-293. (3-25-44)

Stokers, coal—Purchase of coal stokers made easier in view of the improved supply situation. L-75 as amended. (3-25-44)

Stoves, domestic—Restrictions limiting the weight of iron and steel permitted in domestic cooking appliances and heating stoves have been removed. L-23-c as amended. (3-24-44)

Tire retreading equipment—Equipment manufacturers have been provided with a detailed list of 12 types of equipment, arranged in order of urgency, and have been directed to use their facilities to turn out the items most needed before they use facilities to fill orders of secondary importance. L-61 as amended. (3-23-44)



Miracles with minutes*

INDUSTRY fights an eternal battle with time. Reduction of costs and increasing production depend upon packing each minute with achievement. In abrasive blast cleaning the nearest thing to miracle working equipment is the Airless Wheelabrator. It slashes hours to minutes!*

The Wheelabrator has met the need for low-cost, speed cleaning of castings, forgings, heat-treated parts, stampings, etc., in several thousand plants. Many of these applications have been designed to meet special cleaning or finishing problems on such products as: airplane engines, shells, bombs, sanitary ware, locomotive flues, and others.

Directional control of the abrasive blast is achieved mechanically by harnessing centrifugal force. Compressed air is thereby eliminated—and with it go excessive horsepower requirements and expensive investments in compressed air equipment.

Perhaps you have some troublesome, time-consuming, costly cleaning operation that needs correcting. If so, tell us about it and we will respond with suggestions, based on wide experience, showing how your situation can be solved at low cost.

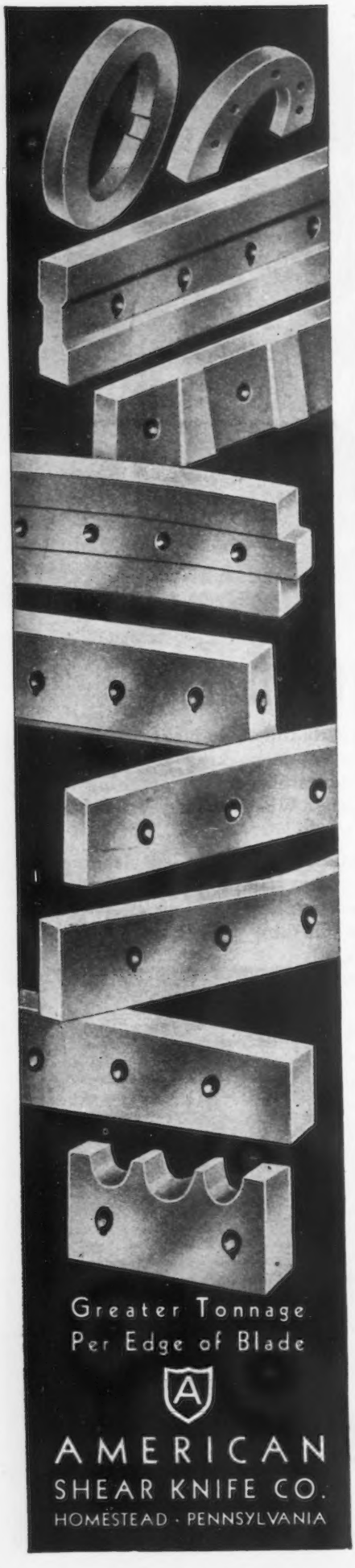
★ **3 Days Cut to 3 Hours**

Cushman Chuck Co., Hartford, Conn., cleaned the same amount of work with the Airless Wheelabrator in the first three hours of its operation that had previously required three days to handle in their old air blast cabinet.

★ **Time Cut One Third**

Plainville Castings Co., Westfield, Mass., cleans in 8 hours with the Airless Wheelabrator the same amount of gray iron castings that had previously required 24 hours in their old rolling barrel method.

American
FOUNDRY EQUIPMENT CO.
510 SOUTH BYRKIT STREET • MISHAWAKA, INDIANA



Under Three Plans

(CONTINUED FROM PAGE 49)

ever had the proper reserves of coking coal or iron ore. The state planners had planned to augment these by shipments from the deposits being developed in the newly won Province of Tung-pien-to. These raw materials were of higher grade than any other yet found in Manchuria. The private enterprise plants on the home islands put forth every effort to secure them for their own starved plants. Many plans were made for the disposition of these raw materials. The entrepreneurs from the islands lobbied their own selfish needs into every plan or else lobbied an unsatisfactory plan into the scrap pile.

Here in this new Province was a "clean sheet of paper" opportunity for planning. Japan desperately needed a modern steel plant for the production of machine building steels. On the Sungari River, 100 miles to the north, a 700,000 kw. hydroelectric project was being developed. One hundred and fifty miles to the south on the Yalu River another like project was pretty well along. The natural thing for the Japanese to have done in 1938 would have been to get a big steel producer going here as quickly as possible. If opinion is correct as to their intentions at this time, an intelligent military urgency certainly should have dictated such a course. From the social angle here was the magnificent opportunity to create wealth. Allied armies will find when they enter this region that pitifully little has been done and will be amazed that a people in such desperate need did so little with so much.

Being distant from them we have better perspective of the Russian and Japanese experiments in State Planning than we have of developments in the United States. Possibly three years' experience with production and distribution according to the dictates of a State Plan is insufficient for proper estimate of its merits or demerits. The U. S. adopted it for the duration. It is believed to have helped somewhat in the business of distribution and aided production by proper distribution of the materials needed by producers. Opinion is very divided concerning its wisdom in making the various capital expenditures that have resulted in expansion of U. S. iron and steel producing plants. The country generally has had considerable respect for the guardians of the Nation's wealth—the bankers. And the country is skeptical of its own ability to act as capably as these guardians with the "social" money being invested. The U. S. has been taught and has learned from experience that money is more useful in some hands than in others. The State Planners and social money financiers of Russia seem to have done a fair job of using the astronomical amounts of money required. They not only got ready for war but raised the general level of their people probably a great deal. The Jap did not help the situation at all by recourse to these socialistic devices. Will the United States?

o o o

"IRON MAN": ***Pictured with his wife, Lloyd Van Ness, who holds the title of "Iron Man" because of his work record of 1,000 consecutive days on the job (including Sundays and holidays) admires a sketch of his Marine son who is somewhere in the South Pacific.***

o o o

IF YOU MEASURE 'EM TO A GNAT'S EYEBROW

. . . Depend on ADECO

FOR YOUR POST-WAR PRECISION PARTS AND ASSEMBLIES

Adeco offers you a dependable source of supply with the know-how, experience and complete facilities for all types of close-tolerance production. It will pay you to include Adeco fabrication in your post-war plans.

ADECO

AIRCRAFT & DIESEL EQUIPMENT CORPORATION

4401 North Ravenswood Avenue
CHICAGO 40, ILLINOIS

"Your Partners in Production"

Among the Week's Trade Notes

Chicago Alloy Products Co. has moved its offices and plant to larger quarters at 19th Street and Washtenaw Avenue, Chicago 8.

•

Rheem Mfg. Co., New York, has announced that it is increasing the facilities of its New Orleans plant to include a high speed production line for all types of steel pails and 100-lb. grease drums.

•

Whiting Corp., Harvey, Ill., has appointed the William H. Ziegler Co., Inc., Minneapolis 14, as its exclusive sales representative in that territory.

•

Crosley Corp., Cincinnati, has appointed the Electric Supply Co., Inc., Shreveport, La., as its distributor in northern Louisiana.

•

Modern Collet and Machine Co., Ecorse, Mich., has announced that rapid progress is being made in the rebuilding and reorganization plans of the company.

•

R. T. Palmer Co., West Hartford, Conn., has been made New England representative of the Sheffield Corp.'s gage and precision instrument division.

•

Firestone Steel Products, a subsidiary of the parent rubber firm, has taken possession of the long idle Pressed Steel Tank Co. plant at Milwaukee, and has been authorized to build a boiler house pending final decision as to how much of the present equipment will be used. The plant will build tire rims for military purposes.

G.M., Hudson, Ford Among New DPC Jobs

Washington

• • • **Defense Plant Corp.**, RFC subsidiary, has authorized the following contracts:

General Motors Corp., Detroit, to provide additional equipment at a plant in Tilton, Ill., at a cost in excess of $190,000, making a total commitment of more than $2,370,000.

Eagle-Picher Mining & Smelting Co., Joplin, Mo., to provide additional facilities at a plant in Henryetta, Okla., at a cost in excess of $60,000, making a total commitment of more than $580,000.

General Malleable Corp., Waukesha, Wis., to provide equipment at a plant in Waukesha at a cost in excess of $165,000.

General Distillers Corp., Louisville, Ky., to provide additional equipment at a plant in Louisville at a cost in excess of $135,000, making a total commitment of more than $160,000.

Hudson Motor Car Co., Detroit, to provide additional plant facilities in Detroit at a cost in excess of $1,765,000, making a total commitment of more than $5,800,000.

Northwestern Aeronautical Corp., Minneapolis, to provide additional equipment at a plant in St. Paul at a cost in excess of $40,000, making a total commitment of more than $890,000.

Ford Motor Co., Dearborn, Mich., to provide additional equipment at plants in Dearborn and Ypsilanti at a cost in excess of $45,000, making a total commitment of more than $325,000.

Great American Industries, Inc., Meriden, Conn., to provide equipment at a plant in Rutland, Vt., at a cost in excess of $150,000.

Willamette Hyster Co., Portland, Ore., to provide additional facilities at a plant in Portland at a cost in excess of $115,000.

Nichols Brothers Transport Co., Dallas, Tex., to provide automotive equipment at a cost in excess of $115,000.

General Ceramics and Steatite Corp., Keasbey, N. J., to provide equipment at a plant in Keasbey at a cost in excess of $90,000.

Resistoflex Corp., Belleville, N. J., to provide plant facilities at Belleville at a cost in excess of $90,000.

IN USE, gears are under unending test, a test which will invariably betray faults of construction or design. These faults may originate in the chemical and physical properties of metal. Fairfield's metallurgical department is expertly staffed and equipped with modern devices for analysis, to examine the metal thoroughly before and after processing.

Fairfield Gears are used in the equipment made by many of the country's leading manufacturers of tractors, power shovels, trucks, stokers, mining machinery, oil machinery, pumps and other equipment.

It may pay you well to familiarize yourself with the advantages offered by Fairfield's gear making and engineering services.

GEARS MADE TO ORDER

SPIRAL BEVEL	HYPOID
STRAIGHT BEVEL	HELICAL
DIFFERENTIAL	WORM
HERRINGBONE	SPUR

FAIRFIELD MANUFACTURING CO.
305 So. Earl Avenue
Lafayette, Ind.

ARMY-E-NAVY

FAIRFIELD for FINE GEARS

MACHINE TOOLS

. . . News and Market Activities

Wages Out of Line with Volume

Cleveland

• • • **A brief survey** of machine tool shipments of the last six years compared with labor costs in machine tool shops during the same period reveals that labor costs have gone to an all-time and possibly irreducible high while shipments have been falling off at a rapid rate.

In the period from 1938 to 1940, wage rate increases in machine tool shops somewhat paralleled shipments thereby minimizing their effect but as shown on the chart the average wage rate then struck sharply upward, pulling rapidly out of line with dollar volume of business. Due to greater numbers of hours being expended by individual workmen during the period up to December, 1941, the take-home pay or average weekly earnings of the employee are shown to be high in comparison with dollar volume of shipments.

As output reached a peak toward the end of 1942, both hourly rates and weekly earnings more nearly equalized although the hourly rate continued to lead shipments in ratio.

At the end of 1942 when machine tool volume started its definite downward trend, wage rates were still on the increase although weekly average earnings began to level off with shorter hours. The average weekly hours per man in the industry in December of 1942 was 53.5 hr. as compared with 49.9 hr. at the end of 1943.

Estimates of machine tool shipments for 1944 indicate a rapid decline to an average monthly shipment of about $30,000,000 as compared to the monthly high average in 1942 of $110,000,000. With wage rates poised at an average of $1.098 per hr. based upon an abnormal volume of business, labor costs for the machine tool industry when operated at the low volume of production promised will be far out of line with profitable operating practice.

•

Monarch Reports $8,000,000 Renegotiation Settlement

• • • **In its annual report** for 1943 the Monarch Machine Tool Co., Sidney, Ohio, shows net sales of $25,951,495 for the fiscal year ended Dec. 31, 1943, a decrease of 9.6 per cent over sales of $28,685,923 for 1942. Net income for 1943 after providing for contingencies, amounted to $804,648, equivalent to $3.83 per share on the 210,000 shares outstanding, compared with $5.27 in 1942.

Under contract renegotiation proceedings covering $24,499,879 of its 1942 sales, the company reached a settlement with the War Department's Price Adjustment Board which required the company to return eight million dollars to the government last year. Allowing for a credit for Federal income and excess profits taxes already paid for the year 1942, the net cost of this renegotiation to the company is $2,178,585, of which $1,556,132 was in cash and $622,453 represented a reduction in the amount of postwar refund bonds.

The total of $2,178,585 has been charged to the reserve for contingencies for which a povision of $2,500,000 to provide for postwar adjustments as well as contract renegotiation was made Dec. 31, 1942.

In his letter to shareholders, Wendell E. Whipp, Monarch president, pointed out that the company's production for 1943 had included not only the manufacture of lathes but also work on two new war contracts, one for geared elevating and training units for the Navy's 40 mm. twin Bofors gun, a second for the power take-off unit used on the Rolls-Royce Merlin aircraft engine. At maximum production these two contracts will absorb half of the plant's capacity.

•

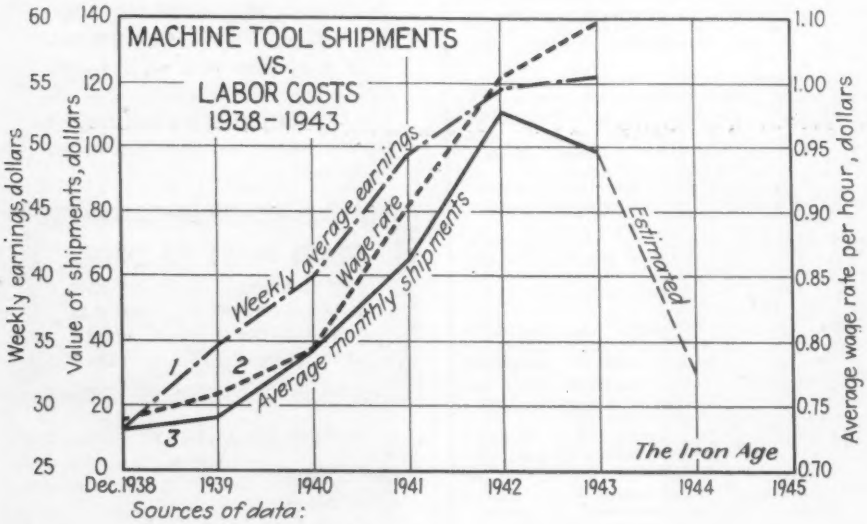
February Tool Shipments Continue Decline

Washington

• • • **Reflecting an almost** steady decline since December, 1942, when they totaled $131,960,000, the value of machine tool shipments in February, according to a preliminary survey by the WPB Tools Division, was $50,150,000, a decrease of 11 per cent from the $56,349,000 shipments in January.

Total orders received by producers in February amounted to $33,512,000, an increase of more than 12½ per cent from the January total of $29,736,000. Cancellations declined more than 37 per cent in February to $2,057,000, comparing with January cancellations of $3,280,000. Unfilled orders remaining on the books at the end of February declined 10.4 per cent to $162,667,000 as compared with a backlog of $181,548,000 at the end of January.

The preliminary report for February covers the 347 machine tool builders reporting to WPB. The report applies only to non-portable power-operated tools, with a valuation of $350 or more each, used to shape metal products by such methods as drilling, grinding, boring, milling and planing.



Sources of data:
1. } Bureau of Labor Statistics
2. }
3. - Nat'l. Mach. Tool Builders Assoc.

But are *You* running a physical-culture school?

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The R & M Type F Hoist has 1000 — 15,000 - pound capacity. Push-button control is standard. Operating with low headroom and handling loads from any angle with perfect balance, the Type F Hoist makes a one-man job of many otherwise cumbersome operations.

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Cleveland . 470 Rockefeller Bldg.
Denver . . . . . 1420 16th St.
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Meriden, Conn. . . . 135 Colony St.
Newark . . . . . 700 Bergen St.
New York . . . . . 200 Varick St.
Philadelphia . . . . 401 N. Broad St.
Pittsburgh . . . . H. W. Oliver Bldg.
Providence . . . . . 44 Clifford St.
San Francisco, 116 New Mtgmry. St.
Seattle . . . . . 216 Walker Bldg.
Syracuse . . . 204 State Tower Bldg.
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NON-FERROUS METALS

. . . News and Market Activities

OPA Increase Brass Ingot Prices

• • • **Increases of 0.75c. a lb.** in the principal grades of 85-5-5-5 group of brass and bronze alloy ingot and 1½c. a lb. in the principal grades of the 80-10-10 group were announced March 31 by OPA in amendment 4 to MPR 202 to become effective April 1.

The higher prices are authorized, OPA said, because producers are unable to absorb the higher cost of virgin metal and higher grade scrap which now have to be used in the production of these groups of ingot, because of insufficient supplies of obsolete scrap normally used, such as old automobile radiators.

The 85-5-5-5 group is used in a wide variety of products, including valves and a number of marine castings, while the 80-10-10 group is used primarily for journal bearings, such as are used in railway cars and locomotives.

The new ceilings for the 85-5-5-5 group range from 12.00 to 13.75c. a lb., according to alloy content, while those for the 80-10-10 group range from 13 to 20c. a lb. These prices are for sales in carload lots, including an allowance for transportation not to exceed 25c. per hundredweight.

Increased ingot prices will mean somewhat higher costs to the foundries which use the grades in question. However, the OPA has discussed this matter with its Industry Advisory Subcommittee and is engaged in studying the impact of these increased costs on foundries selling castings subject to RMPR 125. It may be that some modification of that regulation will be required.

•

Charges Answered

Cleveland

• • • **Victims of a smear campaign** is the position Basic Magnesium, Inc., Cleveland, find themselves in, according to the comments of H. B. Eells, Jr., president of the company. This unhappy position has resulted, according to Mr. Eells, from the Truman Committee report of March 13, in which he said the committee had second-guessed enlarged on, exaggerated, and twisted actions of the company in building its huge Las Vegas magnesium plant so as to place every possible sinister light upon the company's procedure. The Truman Committee, in brief, accused Basic Magnesium of accepting a contract to build a huge magnesium plant with "only the most meager experience . . . no financial resources . . . standing to net $840,000 yearly."

Mr. Eells told by way of rebuttal that so far as these charges were concerned Basic Magnesium had called upon Magnesium Electron, Ltd., an English company with magnesium production experience, to supply the know-how which Basic did not have. From the standpoint of finances, Basic Magnesium was merely a management instrument requiring no financial resources by government request and according to this set-up, taxes would have removed 80 per cent of whatever was paid in management fees, thus automatically reducing the $840,000 profits charged by the Truman Committee to something like $100,000.

The plant itself, which was designed and rated to provide only 18 per cent of the total magnesium production required by the nation, actually proved in 1943 to have produced approximately 39 per cent of all the magnesium produced in all plants.

As a result of the many faceted attacks during the planning and construction of this plant, according to Mr. Eells, confidence in Basic Magnesium's management was so undermined at Washington that the plant was finally turned over to Anaconda Copper Mining Co. Mr. Eells' remarks are plainly keyed to not only salvage industry's opinions of Basic Magnesium, Inc., but also to protect the valued reputation of Basic Refractories, Inc., the parent company.

•

Brass Mill Products Critical

Washington

• • • **About 98 per cent** of total brass rod production is used by the screw machine products industry, WPB said on March 29, and brass mill products are still critical despite adequate mill facilities. Manpower shortages prevent full utilization of facilities.

The supply situation for brass rod and other materials was discussed at the recent Screw Machine Products Industry Advisory Committee meeting. Aluminum is not highly critical, the committee was informed by WPB officials, but conservation for essential uses is desirable. With the exception of magnesium and calcium, most alloying metals cannot be removed readily from aluminum and for this reason aluminum scrap should be carefully segregated.

Advisory committee members said the industry believes it will be able to meet 1944 requirements for screw machine products for the truck production program, if orders are placed well in advance.

•

The monthly average production of brass mills has increased by approximately 246 per cent over 1940. A maximum production of 93,000,000 lb. was reached in March, 1943. It is estimated that the industry has capacity for approximately 100,000,000 lb. In recent months production has dropped to a level of around 73,000,000. However, increased military requirements have brought about a scheduling of 82,000,000 lb. monthly, the highest rate of the last six months. The Division hopes that one to 2,000,000 lb. brass mill products monthly will be received from Canada. It is apparent, however, that there can be no relaxation of control on the use of brass rod.

E. D. Lucas, Aluminum and Magnesium Division, pointed out that only six companies of the screw machine products industry are now reporting aluminum scrap generation. A company is required to segregate aluminum scrap if it generates in excess of 1000 lb. a month. If it generates over 10,000,000 lb., it is required to file a special report. Several committee members commented that aluminum scrap generation has been reduced to a low rate.

During 1943, smelters received and reprocessed into ingots approximately 400,000,000 lb. of scrap, Mr. Lucas said. January reports show that a larger amount was processed than was received during the month. It is believed that scrap generators, dealers and others have approximately a 2-months' supply on hand.

REFINER, SMELTER PRICES

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd	15.00
Aluminum, No. 12 Fdy., (No. 2)	13.50
Aluminum, deoxidizing grades	12.50 to 13.75
Antimony, Asiatic, New York	Nominal
Antimony, American, f.o.b. Laredo, Tex.	14.50
Arsenic, prime white, 99%	4.00
Brass, 85-5-5-5 ingots (No. 115)	13.00
Cadmium, del'd	90.00
Cobalt, 97-99% (dollars per lb.)	$2.11
Copper, electro, Conn. Valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Copper, beryllium, 3.75-4.25% Be; dollars per lb. contained Be	$15.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.5%, dollars per troy oz.	$7.50
Iridium, dollars per troy oz.	$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	30.00
Mercury, dollars per 76-lb. flask, f.o.b. shipping point or port of entry	$191 to $193.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.87
Copper, H.R.	....	17.37	....
Copper, drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercal bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	.

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base. 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums)

Copper, Copper Base Alloys

OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	**8.75**
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	**8.50**
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]
Manganese bronze borings	5.50[2]

OPA Group 4

Automobile radiators	7.00

OPA Group 5

Refinery brass	5.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.375
Loose Yellow Brass Trimmings	7.375

Aluminum

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
W'rt alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For old castings and forgings, pistons, sheets, add ½c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1½c. a lb.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25⅛
Electrolytic, full size	22⅞
cut to size	30⅛
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass: Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00–13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots	40.82–41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbls.	6.80

SCRAP

. . . News and Market Activities

Scrap Consumption Increases While Production Drops, Barringer Warns

St. Louis

• • • **Pointing out** that the production of new steel and castings and hence also the consumption of scrap have held practically at capacity levels thus far in 1943, E. C. Barringer, president and executive secretary of the Institute of Scrap Iron & Steel Inc., in speaking at a meeting of the St. Louis chapter of the Institute on March 29 warned against complacency concerning the supply of scrap.

Analyzing the latest Bureau of Mines report for January, he showed that in that month total stocks of purchased scrap declined 200,000 gross tons while consumption increased 74,000 tons; stocks of home scrap decreased 44,000 tons and consumption increased 93,000 tons; while stocks of pig iron gained only 39,000 tons contrasted with an increase in consumption of 164,000 tons. For all metallics, the January showing was a decline in stocks of 205,000 gross tons and an increase in consumption of 331,000 tons.

It is understood that this situation shows no improvement in February or March to date, and the inventory situation is further unbalanced because supplies of carbon scrap are relatively tighter than those of alloy and blast furnace grades, Mr. Barringer pointed out. The decimation of the ranks of peddlers and collectors will be strongly felt this spring and nothing like the customary spring upturn in receipts of country scrap can be expected.

The only possible offset appears to be the prompt release of materiel of war which is obsolete, and idle and excess inventory from contract terminations. Mr. Barringer urged the immediate marketing of such obsolete and surplus material in order that the scrap industry may recycle it speedily and lessen the drain upon natural resources, particularly iron ore.

Since Pearl Harbor the iron and steel industry has produced 185,000,000 gross tons of steel ingots and about 35,000,000 tons of castings, consuming some 130,000,000 tons of scrap and 120,000,000 tons of pig iron. In 2 1/3 years of war the iron and steel and allied industries have equalled 3½ years of the best peacetime rate of output, a record matched by no other group of basic industries, according to Mr. Barringer.

•

Army Collects 3500 Tons of Tin Cans in January

• • • **The Army is sending nearly 7,000,000 lb. of "detinnable" scrap to detinners monthly, the War Department reported. When the Army began its campaign in May, 1942, it was able to salvage only 74,040 lb. of tin cans for the month.**

A report of the Readjustment Division of the Army Service Forces shows that in January, 1944, the Army collected 6,944,000 lb. of tin scrap. The collection rate for the civilian population accounts for 30,000,000 lb. per month. The lower civilian rate was due, not to lack of enthusiastic support for the campaign, but to the larger proportional number of tin cans used by the Army and the better-organized facilities the armed forces have for salvage operations.

•

Stainless Restrictions Eased

Washington

• • • **Restrictions have** been removed on the use of stainless scrap in the melting of stainless steel, WPB has announced. This action was taken by revoking direction 3 to the Iron and Steel production order, M-21-a, which controlled amounts of scrap in melts by stainless steel producers. Since the direction was issued, producing facilities have been changed to permit greater flexibility in the production of various grades of ferrochromium.

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PITTSBURGH — More heavy melting scrap could be used here, while supplies of foundry and electric furnace grades appear well balanced with demand.

•

CLEVELAND—Heavy inventories here have dulled business although a little local buying is going on. Mills are buying the choicest grades but at a rate that won't raise inventories. No. 1 heavy melting, while scarce, still fills needs. Steel producers who foresee a 20 per cent drop in steel output ahead as a result of manpower shortages are not building inventory. A 20 per cent production drop is said to cause a 30 per cent cut in scrap consumption which makes present stockpiles look more adequate. Electric furnace grades are expected to pick up in the future as a result of slightly heavier alloy meltings. Cast scrap, as always, is very short with demand heavy.

•

BUFFALO—There was little change in the scrap situation this week, with all mills buying and one of them noting a tightening tendency. Scarcity of borings in the face of good demand has resulted in the use of short shoveling turnings as a stopgap. Opening of lake navigation likely will see considerable scrap tonnage coming to Buffalo. Local scrap production remains at a low level.

•

BOSTON—A further drying up of peddler trade and more small wreckers going out of business have added to the pinch in scrap supplies. Instead of helping them, breakable cast users say the cut of $1 a ton has accentuated the scarcity of that material. Malleable scrap is fully as scarce as breakable cast. Yards and brokers generally continue to report business as very quiet. A fair tonnage of shipyard scrap is moving on allotments.

•

CINCINNATI—Quietness continues to prevail in the district scrap market, although dealers indicate that all users are apparently supplied. One mill interest is offering such low prices that it is expected to withdraw from the market. An increase in offerings of plate scrap is reported, but dealers indicate difficulty in handling it because of trimmed labor supplies. Ceiling prices continue to be observed on all deliveries within the district.

•

BIRMINGHAM—There is little demand in this area at present for any material except open hearth and blast furnace grades, and on these grades consumers are declining to absorb more than $1 of the allowed $2 per ton springboard.

•

MILWAUKEE — The continuing decline in automobile graveyard activity is causing a serious shortage of scrap, according to the district salvage chief of WPB. While there has been the substantial increase of 600,000 lb. in copper, bronze, and brass scrap, iron and steel scrap inventories declined more than 600,000 tons in the last six months. The shortages were laid partly to the manpower situation in salvage industries where women cannot be employed.

•

ST. LOUIS—An improvement in movement of country scrap by farmers coming to market for supplies has helped the situation here. Inventories of mills are sufficient for 30 to 90 days operation. Good scrap for mixing with inferior grades is sought. Cast is extremely scarce.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
							Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles, Pittsburg, Cal; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.50	15.50	12.50	14.00	15.50

* Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK CITY or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at $14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing point (cents per gross ton) are: Chicago, 84c.; Pittsburgh, Brackenridge, 55c.; Detroit, 53c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, Pittsburg, 42c.; Seattle, 38c.; Buffalo, Claymont, Harrisburg, 36c.; Atlanta, Birmingham, 32c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Phoenixville, Bethlehem, Kokomo, Duluth and St. Louis, 28c.; Alabama City, Ala., 26c.; Minnequa, Colo., 22c.; Middletown, 14c.; Conshohocken, Sparrows Point, 11c.

*Basic open hearth and foundry grades, and auto springs and crankshafts, deduct 80c. per ton.

BASING POINT includes switching districts of city named.

Basing point	Switching districts:
Pittsburgh	Bessemer, Homestead, Duquesne, Munhall, McKeesport
Cincinnati	Newport
St. Louis	Granite City, E. St. Louis, Madison, Ill.
Chicago	Gary
Claymont	Chester, Pa.
San Francisco	So. San Francisco, Niles, Oakland

MAXIMUM SHIPPING POINT PRICE: Where shipment is wholly or partially by rail or vessel, or combination of rail and vessel, the scrap is at shipping point when placed f.o.b. railroad or f.a.s. vessel. For motor vehicle shipments scrap is at shipping point when loaded. Then maximum shipping point price shall be: (a) For shipping point located within a basing point, prices shown in above table for scrap at basing point in which shipping point is located, minus applicable switching charge deduction shown in paragraph above labeled "Switching Charges." (b) For shipping points outside basing point, price listed in above table hereof for scrap at most favorable basing point, minus lowest charge for transportation from shipping point to such basing point by rail or water carrier or combination. Where vessel movement is involved, in lieu of established dock charge or any cost customarily incurred at the dock, 75c. per ton must be included as part of deduction in computing shipping point price; 50c. at Memphis; $1 at Great Lakes ports; and $1.25 at New England ports. If no established transportation rate exists for a portion of movement from shipping to basing point, actual charge or cost customarily incurred by shipper in such portion of movement shall be included as part of deduction in computing shipping point price. For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less than maximum prices for the corresponding prepared scrap. In no case, however, shall electric furnace, acid open hearth and foundry grades be used as the corresponding prepared scrap. A preparation-in-transit charge for unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced less $2; 75 to 85% Fe less $4; under 75% Fe less $8 per ton. Mill scale less $8 per ton. Mill cinder and grindings, shipping point maximum price of $4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1% oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5% oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c. mill scale, $8 less than No. 1 heavy melting.

Tool Steel Scrap Prices (MPR 379)

	SEGREGATED Solids Per Lb. Cont. W	SEGREGATED Turnings Per Lb. Cont. W
Type 1. 12% min. W, 1% max. Mo	$1.80	$1.60
Type 2. 5 to 12% W, 1% max. Mo	1.60	1.40
Type 3. 1 to 5% W, 1.5% max. Mo	1.25	1.25
*Type 4. 7% min. Mo, 2% max. W	0.125	0.105
*Type 5. 3.5 to 6% Mo, 4.5 to 6% W	0.135	0.115

UNSEGREGATED SOLIDS	UNSEGREGATED TURNINGS
$1.50 per lb. contained W if 5% or more.	$1.30 per lb. contained W if 5% or more.
$1.15 per lb. contained W if 1 to 5%.	$1.00 per lb. contained W if 1 to 5%.
$0.80 per lb. contained Mo if 1.5% or more.	$0.70 per lb. contained Mo if 1.5% or more.

If both W and Mo are within ranges, payment may be for both W and Mo content.

*Per lb. of scrap material.

If segregated, a premium of $1.50 per lb. of contained Co allowed if Co content is 3% or over. No scrap considered segregated if Co content ranges between 0.5 and 3%.

If Cu or Ni content over 0.25%, price shall be reduced by 50%.

If 500 lb. or less is sold, either segregated or unsegregated, price shall be reduced 2c. per lb. of scrap material.

Price schedules on railroad scrap and cast iron scrap will be carried in the last issue of each month.

Comparison of Prices . . .

Advance Over Past Week in **Heavy Type**; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

(Cents Per Lb.)	April 4, 1944	Mar. 28, 1944	Feb. 29, 1944	April 6, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

(Per Gross Ton)	April 4, 1944	Mar. 28, 1944	Feb. 29, 1944	April 6, 1943
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.89	$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	23.94	23.94	23.94	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.00	$7.00	$6.50	$6.00
Foundry coke, prompt	8.25	7.50	7.50	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 157-165.

Composite Prices . . .

Starting with the issue of **April 22, 1943**, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the **April 22, 1943**, issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
April 4, 1944	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 16
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58. Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in **Aug. 28, 1941**, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

. . . Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price to be used in figuring annealed, bright finish wires, commercial spring wire.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long Ternes[3]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
Hot Rolled Strip[2]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold Rolled Strip[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
Coke Tin Plate, Base Box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
.50 Electro Tin Plate, Box	$4.50	$4.50	$4.50						$4.60						
.75 Electro Tin Plate, Box	$4.65		$4.65						$4.75						
Black Plate (29 gage)[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.37¢
Mfg. Ternes, Special Box	$4.30	$4.30	$4.30						$4.40						
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (Billet) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[13]	2.25¢	2.39¢	
Reinforcing (Rail) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	c2.55¢[13]	2.25¢		2.47¢
Cold Finished Bars[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)			(Toledo = 2.80¢)			2.99¢	2.97¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	(Coatesville and Claymont = 2.10¢) 2.10¢	2.35¢		2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95	4.15¢		3.70¢	3.59¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
Bright Wire[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)		(Duluth = 2.65¢)			3.10¢			2.92¢
Galvanized Wire	Add proper size extra and galvanizing extra to Bright Wire base.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6

Slabs—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. $34 Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel Co. $47.50.

Blooms—Phoenix Iron Co. (rerolling) $41, (forging) $47.

Sheet Bar—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto; Phoenix Iron Co. $47.00 mill.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. (small) $36 Portsmouth, Ohio; (blooming mill sizes) applicable base, f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.69 Birmingham; Ford Motor Co. $34 Dearborn, Mich.

Structural Shapes—Phoenix Iron Co. $2.35 basing pts., (export) $2.50 Phoenixville; Knoxville Iron Co. $2.30 basing pts.

Bar Size Shapes—(Angles) W. Ames & Co., 10 tons or over, $3.10 mill.

Rails—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp. $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. $2.65 mill; Knoxville Iron Co. $2.25 basing pts.; Kaiser Co. $3.20 Pacific Ports.

Merchant Bars—W. Ames & Co., 10 tons and over, $2.85 mill; Eckels-Nye Steel Corp., $2.50 basing pts. (rail steel) $2.40; Phoenix Iron Co. $2.40 basing pts.; Sweet Steel Co. (rail steel) $2.35 mill; Joslyn Mfg. & Supply Co. $2.35 Chicago; Central Iron & Steel Co. $2.20 basing pts.; Granite City Steel Co. $2.35 Granite City; Calumet Steel Div., Borg Warner Corp. (8 in. mill bars) $2.35 Chicago; Knoxville Iron Co. $2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.

Reinforcing Bars—W. Ames & Co., 10 tons and over, $2.85 mill; Sweet Steel Co. (rail steel) $2.35 mill; Columbia Steel Co. $2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Massfield, Mass., f.o.b. Massfield.; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. $2.30 Chicago; Knoxville Iron Co. $2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., $2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co., $3.75 basing pts.; Parkersburg Iron & Steel Co. $3.85 Parkersburg; Apollo Steel Co. $3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is $2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	3.518	4.872[8]	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613[3]	5.010	3.974[6]	4.772	3.768	3.758	3.753	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.394	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00[4]	3.70	4.659[17]	3.609	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.46	5.257[4]	3.86	4.35[17]	3.811[3]	3.811[3]	3.761[3]	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.43	....	....	....	....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.965[7]	4.66	3.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	4.95	5.358	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.53[17]	....	6.17[18]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	5.90	....	....	....	....

NATIONAL EMERGENCY (N. E.) STEELS
(Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar-Strip	Billets, Blooms and Slabs	Bars and Bar-Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35	.....	.....	.....	.10c	$2.00	.....	.....
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35	.....	.....	.....	.10	2.00	.....	.....
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35	.....	.....	.....	.10	2.00	.....	.....
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35	.....	.....	.....	.10	2.00	.....	.....
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35	.....	.....	.....	.10	2.00	.....	.....
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25¢	$25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 9720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40 .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9260	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9261	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.10/ .25	.....	.....	.65	13.00	.....	.....
NE 9262	.55/ .65	.70/1.90	.040	.040	1.80/2.20	.25/ .49	.....	.....	.65	13.00	.....	.....
NE 9415	.13/ .18	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.20/ .35	.30/ 50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9545*	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00

*Recommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00
Exceptions: Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., $34.25.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00
Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00
Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton 54.00
Price delivered Detroit $2.00 higher; E. Michigan $3.00 higher.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
13 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are $2.00 higher; E. Michigan, $3 higher.
Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb
Grooved, universal and sheared	1.90c

Wire Rods

(*No. 5 to 9/32 in.*)

	Per Lb
Pittsburgh, Chicago, Cleveland	2.00c
Worcester, Mass.	2.10c
Birmingham	2.00c
San Francisco	2.50c
Galveston	2.25c

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(*F.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 4c. higher.

Make safety simple for inexperienced men

If your men can be trained TO LET THE LOAD REST IN THE CURVE OF THE HOOK, NOT ON THE POINT—equipment will be preserved and accidents prevented. In most instances it's easy to follow this simple rule. But new men need to be told about this and other precautions which save lives, save money, and speed war production. We'll gladly supply information if you're interested.

The highest possible preference rating should be obtained and shown on orders placed for chain.

AMERICAN CHAIN DIVISION

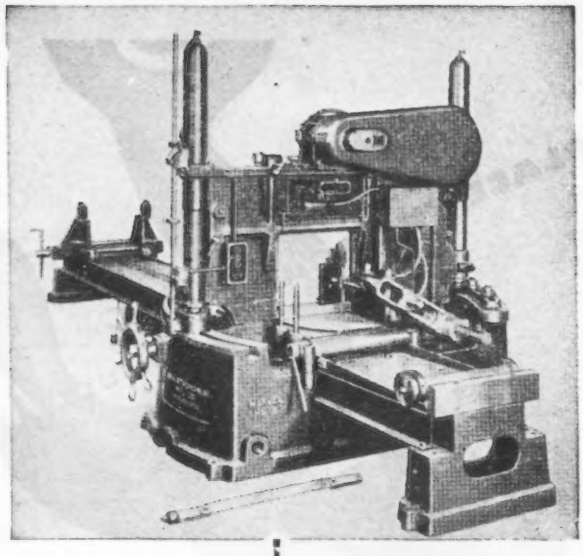
York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT, CONNECTICUT

In Business for Your Safety

CUTS the Toughest Steels and Largest Sizes *easily.*



This giant hydraulic metal-cutting saw is more than just a larger hack saw. It is a new development in metal-cutting methods that introduces a new principle of metal sawing — the Roll-stroke blade action makes it possible to cut the toughest steels in the largest sizes easily and rapidly. It also permits a simple and efficient, very low pressure Hydraulic Feed System.

Built for heavy work, completely enclosed in heavy housing, this machine will stand up under the rough usage of the average steel mill warehouse and forge shop, where it will speed cutting-off, and reduce material loss.

MARVEL No. 18

Giant Hydraulic Hack Saw

Capacity 18"x18"

Cuts angles up to 45° by simply swiveling upper machine housing.

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ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U. S. A.

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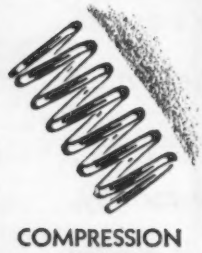
On the Job in Every Department

A well-rounded service to give spring action in all its forms—with design and research facilities—latest types of heat-treatment—for durable, uniform springs.



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TORSION SPRINGS

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FLAT SPRINGS and Small Stampings, too

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TWO PLANTS FOR SPRING SERVICE
DETROIT and ANN ARBOR MICHIGAN

B-G-R PRODUCTS SERVE OUR COUNTRY-ON LAND, AT SEA, AND IN THE AIR

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

	Black	Gal
Steel (Butt Weld)		
⅛ in.	63½	51
¼ in.	66½	55
⅜ to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
⅛ in.	24	3½
¼ in.	30	10
⅜ and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
⅛ in.	61½	50½
¼ in.	65½	54½
⅜ to 3 in.	67	57
Wrought Iron (Same as Above)		
⅛ in.	25	0
¼ in.	31	12
⅜ to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.80
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	*Seamless Hot Rolled*	*Lap Weld Hot Rolled*
2 in. o.d. 13 B.W.G.	15.03	13.04	12.35
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.55
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.60

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails	$2.55	$3.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	$0.67	$0.85
Fence posts, carloads	.69	.86
Single loop bale ties	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire	.70	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.
†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland Chicago, New York on lots of 200 lb. or over.

Large Rivets
(½ in. and larger)

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets
(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
30-lb. coating I.C.	7.50	15.00

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ELECTRO PLATING

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Zinc Plating
Cadmium Plating
Bonderizing . . Parkerizing
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Forming, Welding, Fabricating—

3000 lb. Electro Processing Oven of ¼" steel plate (50" long x 36" inside diameter) shown with rock wool jacket removed . . . fabricated by Brandt for a large cork board plant.

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Here is an 8½ acre plant . . . with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications . . . from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. Extensive war contracts necessarily limit our present acceptance of new business for immediate delivery. For information, address: Charles T. Brandt, Inc., Baltimore-30, Maryland.

BRANDT of Baltimore—*Craftsmen in Metal Since 1890*

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	*$25.50*	*$25.00*	*$26.50*	*$26.00*	.....	.....
Brooklyn	*27.50*	*27.00*	.....	*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia (4)	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50	.....
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.50	25.00	24.50	29.50	.....
Cincinnati, Ohio	*25.11*	*24.61*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	.....*$37.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*32.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	*32.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	34.00
Lyles, Tenn. fc. (2)	.....	.....	.....	.....	.....	33.00
St. Paul	*26.63*	26.13	*27.13*	*26.63*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another $1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for $28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa., permitted to charge $1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21⅛ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh, 96 + % Fe	13½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1.
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh,	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58½c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum power, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

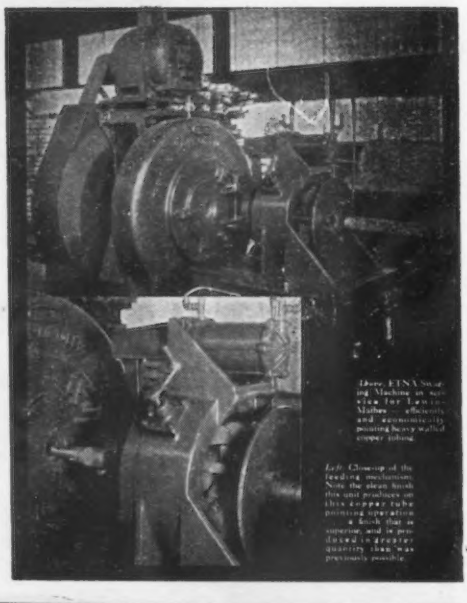
COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.38
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges. **Mo., Ala., and Tenn. producers—$13.35.

ETNA

A client of ours had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so they did the safe and logical thing—they put their swaging job up to Etna.



The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

PRICES

REFRACTORIES
(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60
Silica Brick	
Pennsylvania and Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00
Chrome Brick	*Per Net Ton*
Standard, chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton $40.00
Angle splice bars, 100 lb. 2.70

(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

CORROSION AND HEAT-RESISTING STEEL
(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

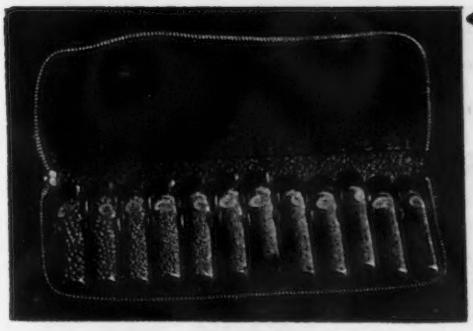
	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS
(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including Dynamo. Pacific ports add 75c. per 100 lb. on all grades.



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We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

Just check this list

✓ for information on pneumatic and hydraulic production equipment

- ★ Hydraulic Presses, Bulletin 60
- ★ Pneumatic Cylinders and Air Control Valves, Bulletin 57
- ★ Hydraulic Cylinders, Bulletin 35
- ★ Pneumatic Arbor Presses, Bulletin 46
- ★ Centrifugal Quenching Press, Bulletin 55
- ★ "Allen" Pneumatic Riveters, Bulletin 53
- ★ Air Pressure Regulating Valves, Bulletin 56
- ★ Pneumatic Vises, Bulletin 59

You will find helpful data in these bulletins. Any or all of them will be sent on request.

HANNIFIN MANUFACTURING COMPANY

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ALL SHAPES • ALL SIZES • ALL MATERIALS

LEE SPRING COMPANY, Inc.
30 MAIN STREET BROOKLYN N.Y.

LEE-BUILT TRADE MARK SPRINGS

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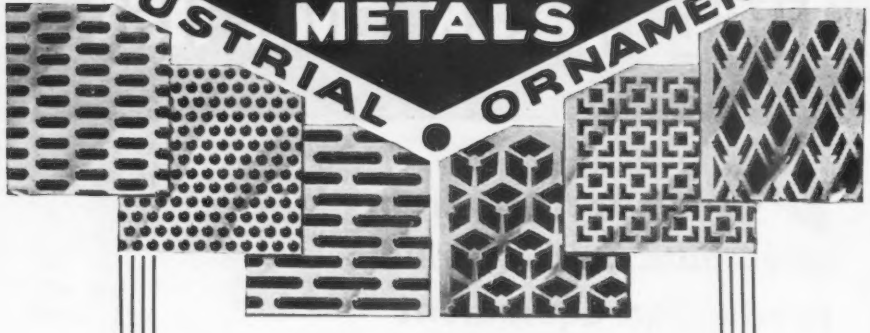
INDUSTRIAL • ORNAMENTAL



ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

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Eastern Office, 114 Liberty Street, New York 6, N. Y.

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si	8.90c.	9.05c.	9.55c.
90-95% Si	11.05c.	11.20c.	11.65c.

Spot sales add: .45c per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb for 80-90% and 90-95% Si.

Silvery Iron

(*Per Gross Ton, base 6.00 to 6.50 Si*)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are $1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(*65-72% Cr, 2% max. Si*)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

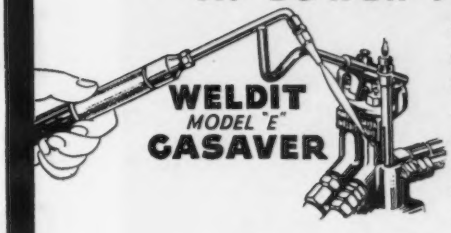
	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten. 10,000 lb. of more...	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	$1.20
Under 2000 lb.	1.30
Per lb. alloy	$1.20
Ton lots	$1.25
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb contained Cb.	
2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti...	$1.23
Less ton lots	$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equaled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump, f.o.b. plant with usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.

Safe Welding

AT LOWER PRODUCTION COSTS



The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as *fifty* per cent. Prevents injury to workmen—or sudden fires—from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . *No readjusting required.* . . . Price $10.00 at Detroit. Order today.

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The Weldit Model CW Blowpipe is in daily use by many foremost industrial plants. . . . Built in accordance with the recommendations of leading fabricators of sheet metal products. . . . Operates on either natural gas, manufactured gas, or other low temperature fuel gas and compressed air. Stands up under rough shop use. . . . Send for literature.

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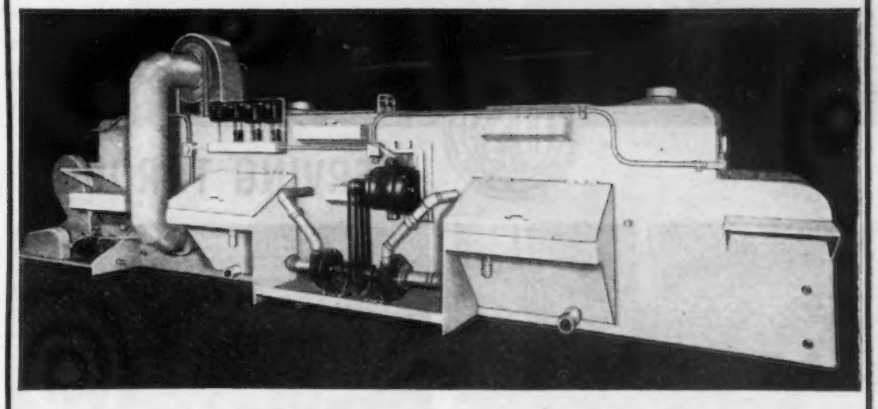

YOURS if you want to get highest production and lowest costs in metal parts cleaning!

Here's proof of what RANSOHOFF EQUIPMENT does in satisfying users:

1-2-3 . . . yes, this is the *third* such machine installed by the same company. Ordered . . . re-ordered and re-ordered again because they continue to maintain superiority and efficiency. They'll do it for you, too.

*Illustration shows one of an installation of three conveyor type machines for washing, rinsing, drying and rust-proofing bearing races after lapping.

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for automatic, economical washing, rinsing, drying, rustproofing, pickling, burnishing, descaling.

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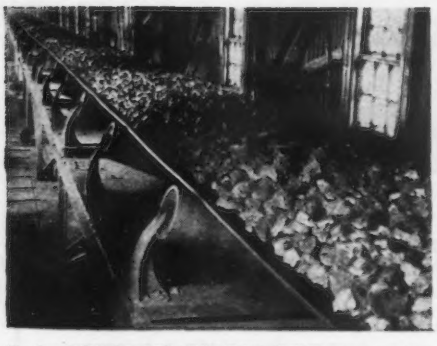
Every conveyor belt installation is considered an individual problem by United States Rubber Belt Engineers. Each belt is engineered on the basis of the type and amount of material to be handled, distance traveled, speed, changing elevations and other factors.

Right now, the full force of this broad range experience is brought to bear on the problems of engineering conveyor belts of synthetic rubber.

During the last six years, United States Rubber Belt Engineers have successfully designed and manufactured belts of synthetic rubber to meet a variety of *special* conditions. This experience is proving of incalculable value, now that synthetic rubber belts are a "must." *We invite you to submit your questions and problems relating to conveyor belts for your individual operations.*

SERVING THROUGH SCIENCE



U. S. SYNTHETIC RUBBER BELT conveying highly abrasive oil-sprayed coke. This 680-ft. belt, in successful operation for 4 years, is still in excellent condition. Its perfect alignment under capacity loads reflects U. S. Staff Engineering.

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